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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

ON THE IMPROVEMENT OF TOBACCO LANDS BY CLOVER.

Addressed to the Charlotte Agricultural Society, at its Annual Meeting, held the 17th August, 1836, by ANDERSON C. MORTON—and ordered to be published in the Farmers' Register.

The 22d article of our constitution, makes it the duty of each member to make a communication at the annual meeting, on some agricultural subject. More in obedience to this requisition, than from the hope of affording any thing valuable in itself, or acceptable to the meeting, have I prepared a sketch, which, if not deserving commendation on any other account, shall at any rate claim the credit of brevity.

It is said that every man has his hobby, and that hobby is apt to be indulged in, at the expense of every thing else: but this thing of riding one's hobby, has not unfrequently led to results very important to the world. Now I shall present to the Society, a subject which I have more than once urged, and which, I believe, will go far to restore the exhausted soil of our country. It is the cultivation of the grasses, clover included; not the mere seeding, but that earnest, persevering, skilful cultivation, which will insure success. Too many of our planters, hearing of the success of those who have resorted to the cultivation of the grasses, have gone heedlessly to the expense of buying seeds and sowing them on lands actually too poor to grow them; and instead of seeing their lands thus enriched, and reaping rich harvests, only reap disappointment. If this were not a very common error, it would be useless to expose it: indeed, so common is it, that it is strange it does not correct itself. It shows that grass is looked upon by some, as the panacea by which every disease of old mother earth is at once to be healed, and by which her most barren spots are to be made to bear abundant crops. There is an infatuation in the minds of some people on this subject, that seems scarcely to invade them in relation to any other belonging to agriculture. We should think very strangely of the man who should select his poorest spots for raising tobacco plants: yet it requires just as much manure to prepare the soil for the production of a heavy crop of grass, as of tobacco. Grass is, beyond all question, one of the most powerful agents in promoting the improvement of, and in preserving our lands, that has ever been employed; but like every other agent, it must be rightly applied. Judging from actual experiment, I am led to conclude that land made rich enough to produce a heavy crop of tobacco and wheat, will produce heavy crops of grass, and that such land may be cultivated on the three-shift system: say, one crop of tobacco, one of wheat, and one of clover, *ad infinitum*, without deterioration, if not with a gradual improvement. Indeed, I think I am warranted by my experience, in saying that such lands, if naturally adapted to the growth of tobacco, wheat, and clover, will, on this system, rapidly improve, even without the aid of plaster; and with its aid, would no doubt continue to advance until it reached the very highest point of fertility. The best tobacco on my plantation at this time, is on land that has never been manured, and has been cultivated for nine years on this plan, and it is the most promising crop that has ever grown on the land since it has been reduced from the forest state; and one heavy crop of grass has been mowed from it within that time, though, when ploughed last spring, it was thickly coated with the last years' growth. It has been my object, for years past, to get all my tobacco land under this system. That object was nearly completed last year. Nine fortieths of my crop was on land that had been put in grass, and after losing two or three hogsheads by the frost, I still secured a much finer crop than I ever made before. This year, my object had been fully carried into effect, had I not sold my land; and I should hereafter have been able, through the aid of clover and grass, to have carried on the tobacco culture without applying one single particle of manure to it. And judging from my observation and experience of the past, I doubt not, that in ten years more, by applying the manure to the corn land, my crops would have been doubled. And in thus adding to my resources for tobacco, I have also, in the same proportion, improved my crops of wheat. Had I remained on the land another year, the whole of the crop of wheat would have been on tobacco land, and every part of the land now in tobacco, seeded in wheat; and still land enough in grass, which comes in rotation next year, for the whole crop of tobacco.

In recommending this system, I feel the utmost confidence, having given it such a test as proves to me, most conclusively, that when lands are adapted to grass and clover, and made rich enough to produce heavy crops, they may be not only kept up for tobacco, but improve yearly. And the same system, if pursued in regard to the corn land, would give precisely the same results.

In this system, there is nothing fanciful. It is based on common sense principles; it is simple, easy of application, adds nothing to the labor of the planter, and goes hand in hand with the cultivation of tobacco. But in order to carry it fully into effect, we must have, what is not uncommon in this country, ample space for standing pasture: we must vary our scene of manuring every year, and what we do manure, must be made rich. When there is land to clear, it comes happily to the aid of this system, as no land ought to be cleared for tobacco, that is not sufficiently fertile to be kept up by it; nor need any land be expected to be made rich by sowing grass, when it is too poor to produce it. I would not discourage any attempt to raise grass, but only urge that, to raise it successfully, you must give it the means of growing. You might as well expect to make your stock thrive without food, as grass grow, when the soil is too poor to produce it. But feed your soil with manure, cover it with grass, and you may calculate, certainly, on its paying you well for your labor.

This system requires time, I know, as well as patience and perseverance. But it is completely within the reach of every man in this house. There are those who contend that the cultivation of tobacco is utterly at war with the improvement of our lands, and that to improve at all, we must first abandon this crop. But if the system which I recommend be based on true principles; if it be practicable--if it be in the reach of all—what hinders us from going into it at once? One of our worthy members, very truly and wisely at the last meeting, told us, that to abandon our tobacco crop, would be an abandonment of our country. What other resource have we? None. I conceive this doctrine, that we cannot make tobacco and improve our lands, as fraught with incalculable mischief: it acts as an extinguisher to every praiseworthy effort, and a damper to every generous motive of those who would take up the cause of agricultural improvement, and urge it upon the people; and its prevalence has driven more of our industrious citizens to emigration than all other causes combined. But it is a remarkable fact, that this doctrine is held only by those who have done nothing for the good cause, either by their own example, or by encouraging the efforts of others—those who are not satisfied to receive daily a golden egg from the goose, but must rip her at once. I am, perhaps, too sanguine; but I do verily believe that this portion of Virginia is as highly susceptible of improvement as any portion of the globe: and I as firmly believe, that the cultivation of tobacco does not (however it may, and does impede our progress,) impose, necessarily, a complete check to improvement. All know that it requires rich land, and that lots producing heavy crops of it, will produce heavy ameliorating crops, and by changing the scene of manuring yearly, you will yearly add to the surface. Those who choose to make the calculation, may very easily tell how many years it will require, to manure a surface sufficiently large to give them a three shift rotation. The man who cultivates 100,000 hills, can clear and manure 50,000 annually. Say that he does this next winter, and in the fall of '37, seeds it in wheat and clover, and so on, annually adding 50,000 hills to his available surface, he may, in six years, have secured 300,000 hills, which will give him the full amount of tobacco land; and after that, the whole of his manure may be applied to his corn land. Is there any thing absurd or impossible in this? I think not. So far from being discouraged at this view of the subject, we have every reason to press forward. Indeed it would not be absurd—it would not be unreasonable to say, that by a judicious, economical, and persevering adherence to this or some other similar system, an ordinary farm may become one common scene of luxuriance, a perfect Goshen, or one great tobacco lot—and that in no great many years. Thus, in a life of thirty years, the man who annually manures twenty acres, would see himself surrounded by a plantation of six hundred acres of land, every acre of which would be rich enough for a garden. He would then have no reason to sever the ties of blood and friendship, and bury himself and his sons in the wilds of the west, or the poisoned swamps of Arkansas, or mingle with the mongrel races of Texas.

Gentlemen, we listen too much to discouragements. Virginia is ruined by the mistaken policy of her sons, and that sad mistake, that the cultivation of tobacco is necessarily ruinous. I know that great popular changes are not often produced by reason alone; but here we have interest, love of country, and various other considerations working in favor of our cause, and strengthening our arguments in establishing the fact, that our country is not doomed to hopeless desolation.

I shall, before your next meeting, in all probability have changed my place of residence; but I shall retain my membership, and gain all I can by occasionally meeting you here: and should I ever have it in my power to contribute my mite to the great cause, either here or elsewhere, I shall be prompt to do it. Emigration, legislation, and still more, reckless cultivation, or rather mutilation of her soil, has kept this old commonwealth down, until many seem to think she is in a hopeless decline; but though her energies are crippled, she is yet a noble star of the old constellation. She will rouse herself. She has materials enough, if her sons will still remain to maintain her weight. Her institutions of learning, her agricultural societies, her rail roads, her canals, must rouse her from her Rip Van Winkle slumber. She will yet put on her beautiful raiment, and renew her youth, and resume her stand among the old 13: And it is you, and such as you, that must be the instruments of this new creation. I have the most satisfactory evidence, that this society has already given an impulse that will be long and deeply felt. The people need to be roused. Set them to thinking, and half the battle is over. But if you suffer your efforts to be palsied—if you let this institution sleep the sleep of death, I care not what may be your individual example, your influence will be lost.

I hope then, your devotion to the best interest of your community, as well as regard for your own, will keep you together as a band of brothers.

I hope that I shall be excused for keeping you so long with this disjointed sketch, and only regret, that in return for your patient attention, I have not given you something to merit it.

From the History of Insects in the Family Library.

NATURAL HISTORY OF ANTS.

[Continued from p. 333 vol. IV.]

The wonders of the ant-tribe are far from being exhausted; we have seen them subjugating their own species, and reducing them to the condition of domestic slaves. But a more singular trait in their manners remains to be stated. They keep and feed certain other insects, from which they extract a sweet and nutritious liquid, in the same manner as we obtain milk from cows. There are two species of insects from which the ant-tribe abstract this juice—the aphides, or plant-lice, and the gall-insects. Linnæus, and after him other naturalists, have called these insects the milch cattle of the ants; and the term is not inapplicable. In the proper season, any person, who may choose to be at the pains of watching their proceedings, may see, as Linnæus says, the ants ascending trees that they may milk their cows, the aphides. The substance which is here called milk is a saccharine fluid, which these insects secrete; it is scarcely inferior to honey in sweetness,

and issues in limpid drops from the body of the insect, by two little tubes placed one on each side just above the abdomen. The aphides insert their suckers into the tender bark of a tree, and employ themselves without intermission in absorbing its sap; which, having passed through the digestive system of the insect, is discharged by the organs just described. When no ants happen to be at hand to receive this treasure, the insects eject it to a distance by a jerking motion, which at regular intervals they give their bodies. When the ants, however, are in attendance, they carefully watch the emission of this precious fluid, and immediately suck it down. The ants not only consume this fluid when voluntarily ejected by the aphides, but what is still more surprising, they know how to make them yield it at pleasure; or, in other terms, to milk them. On this occasion the antennæ of the ants discharge the same functions as the fingers of a milk-maid: with these organs, moved very rapidly, they pat the abdomen of an aphis first on one side and then on the other: a little drop of the much coveted juice immediately issues forth, which the ant eagerly conveys to its mouth. The milk of one aphis having been thus exhausted, the ant proceeds to treat others in the same manner, until at length it is satiated, when it returns to its nest.

A still more singular fact, connected with this branch of the natural economy of these insects, remains to be stated. These cows are not always considered the common property of a whole tribe; on the contrary, some of them are appropriated to the exclusive use of the inhabitants of a particular hill or nest; and to keep these cows to themselves, they exert all their skill and industry. Sometimes the aphides inhabiting the branches of a particular tree, or the stalks of a particular plant, are thus appropriated; and if any vagrant foreigners attempt to share this treasure with its true owners, the latter, exhibiting every symptom of uneasiness aud anger, employ all their efforts to drive them away.

Some species of ants go in search of these aphides on the vegetables where they feed; but there are others, as the yellow ant, which collect a large herd of a kind of aphis, which derives its nutriment from the roots of grass and other plants. These milch kine they remove from their native plants and domesticate in their habitations, affording, as Huber justly observes, an example of almost human industry and sagacity. On turning up the nest of the yellow ant, this naturalists one day saw a variety of aphides either wandering about in the different chambers, or attached to the roots of plants which penetrated into the interior. The ants appeared to be extremely jealous of their stock of cattle; they followed them about and caressed them, whenever they wished for the honeyed juice, which the aphis never refused to yield. On the slightest appearance of danger, they took them up in their mouths, and gently removed them to a more sheltered and more secure spot. They dispute with other ants for them, and in short watch them as keenly as any pastoral people would guard the herds which form their wealth. Other species, which do not gather the aphides together in their own nest, still seem to look on them as private property; they set sentinels to protect their places of resort and drive away other ants; and, what is still more extraordinary, they enclose them as a farmer does his sheep, to preserve them not only from rival ants, but also from the natural enemies of the aphis.

If the branch on which the aphides feed be conveniently situated, the ants have recourse to a very effectual expedient to keep off all trespassers: they construct around the branch containing the aphides a tube of earth, or some other material, and in this enclosure, formed near the nest and generally communicating with it, they secure their cattle against all interlopers.

The brown ant has been observed by Huber to build a chamber around the stem of a thistle, in such a way that the stalk passed through the centre, so that from their ant-hill they had only to climb the thistle-stalk, in order to enter this cattle-fold, which was suspended in mid-air. The interior, smooth and compact, was entirely formed of earth; it contained an extensive family of insect-cows, sheltered from the inclemencies of the weather, and protected from their enemies. These edifices are not always constructed near the bottom of the thistle-stalk; once Huber saw one at the height of five feet from the ground. "These proceedings," says he, "are by no means common: we cannot attribute them to an habitual routine." Indeed, the modes of preserving their cattle seem to be as various as those practised by man. Some ants receive their food from the aphides which suck the juices of the common plaintain, and these at first take their station near the flower of the plant; as soon as the flowers wither, these insect-cows take shelter under the radicle leaves; upon which the ants, which before had climbed up to them, now surround them with a mud wall, and, making a covered gallery by way of communication between their nest and the "paddock," extract food from them at their convenience and pleasure.

During autumn, winter, and spring, many species of ants keep aphides. Indeed, in winter they would be exposed to the horrors of a famine, did they not rely for food on their cattle; for though they become torpid when exposed to intense cold, yet, for the most part, the depth of their nests preserves for them a temperature sufficiently high to prevent this contingency. Their milch cows are then kept on the roots of the plants which penetrate the interior of the nest, and furnish an abundant supply of liquid in which their keepers delight. And not only is the full-grown animal kept, but its eggs are watched and guarded with that care which warrent us in supposing that the ant knows their full value.

It is of real consequence to the ants that the hatching of the eggs of the aphides should take place as early in the spring as possible, in order to ensure an early supply of food for their colony; and with the view of hastening this event, they deposite them in the warmest part of their dwelling.

The mode in which the habitations of the ants are constructed varies according to the species of this insect. Some excavate their dwellings, and are hence denominated *mining* ants; others build them on the surface of the ground, and are, in consequence, termed *mason* ants; and a third species take up their residence in hollow trees. But whatever may be the mode in which they form their habitations, they always contrive to

shelter themselves completely from the rain. The longest and loftiest chamber is placed near the centre of the nest, and here all the galleries terminate; the subterranean chambers are horizontal. In the evening, the aperture of the nests of some ants is always closed, and in the morning re-opened; but according to Huber, the brown ant has been seen to work during a moon light night.

Having in the day time noticed some aphides upon a thistle, he examined it again in the night about eleven o'clock, and found his ants busy milking their cows. At the same hour, another night, he observed, on an elder-tree, the little negro-ant engaged in the same employment.

From the result of their labors, it might be inferred that they were actuated by a common mechanical instinct, yet this is by no means the case: no two apartments are alike in the same nest; and no two nests have exactly the same arrangements. Each ant seems capable of conceiving a a particular plan, which is in some manner made intelligible to the rest, and practically executed. If pieces of straw be placed conveniently for its purpose, an ant, after careful examination, proceeds to make use of this appropriate supply of materials. In another case it would have to drag bits of stubble, then arrange them, and then build. The operations of these insects vary very much from the beautiful and geometrically precise labor of bees. Indeed they seem to act so completely according to the exigencies of each case, that the moving power which impels and guides their operations approaches so closely to human reason, that to establish a distinction appears extremely difficult.

The strength and perseverance of ants are perfectly wonderful. Kirby state, that he once saw two or three horse-ants hauling along a young snake not dead, which was of the thickness of a goosequill. St. Pierre relates, that he saw a number of ants carrying off a Patagonian centipede: they had seized it by all its legs, and bore it along as workmen do a large piece of timber. Nothing can divert them from any purpose which they have undertaken to execute. In warm climates they may be frequently seen marching in columns which exceed all power of enumeration; always pursuing a straight course, from which nothing can cause them to deviate: if they come to a house or other building, they storm or undermine it; if a river cross their path, they will endeavor to swim over it, though millions perish in the attempt.

It is related of the celebrated conqueror Timour, that being once forced to take shelter from his enemies in a ruined building, he sat alone many hours: desirous of diverting his mind from his hopeless condition, he fixed his observation upon an ant which was carrying a grain of corn (probably a pupa) larger than itself, up a high wall. Numbering the efforts that it made to accomplish this object, he found that the grain fell sixty-nine times to the ground; but the seventieth time it reached the top of the wall. "This sight," said Timour, "gave me courage at the moment, and I have never forgotten the lessen it conveyed."

The Jesuit Dobrizhoffer, in his History of the Abipones, gives the following very singular account of the ravages of ants known in Paraguay. He furnishes no means of ascertaining the species whose proceedings he describes. "The largest ants which I had an opportunity of seeing are formidable on account of their undermining buildings. They make burrows, with infinite labor, under churches and houses, digging deep, sinuous meanders in the earth, and exerting their utmost strength to throw out the loosened sods. Having got wings, they fly off in all directions, on the approach of heavy showers, with the same ill fortune as Icarus, but with this difference, that he perished in the sea, they on the ground, to which they fall when their wings are wetted by the rain. Moreover those holes in the earth by which the ants used first to pass admit the rain-water, which inundates the caves of the ants, and undermines the building, causing the wooden beams that uphold the wall and roof, first to give way, and, unless immediately supported, to fall along with the house. This is a common spectacle in Paraguay. The whole hill on which St. Joachim was built was covered with ant-hills, and full of subterranean cavities. Our house and the one adjoining suffered much from these insects. The chief altar was rendered useless for many days; for, it being rainy weather, the lurking ants flew in swarms from their caves, and not being able to support a long flight, fell upon the priest, the altar, and sacred utensils, defiling every thing. Ten outlets by which they broke from their caves being closed up, next day they opened twenty more. One evening there arose a violent storm, with horrible thunder and lightning. A heavy shower seemed to have converted our court-yard into a sloping lake, the wall itself withstanding the course of the waters. My companion betook himself to my apartment. Meantime, an Indian, the churchwarden, arrives announcing that the floor of the church was beginning to gape, and the wall to open and be inclined. I snatched up a lamp and ran to the place, but had hardly quitted the threshold of my door, when I perceived a gap in the earth; and before I was aware of any danger, sunk up to the shoulders in a pit, in the very place of the chief altar, but scrambled out of it, by the help of a churchwarden, as quickly as I had got in, for under that altar the ants seemed to have made their metropolis: the cavern was many feet long and wide, so that it had the appearance of a wine-cellar. As often as earth was thrown in by the Indians to fill it, so often was it dug out by the ants. In this universal trepidation, all the Indians were called to prop the gaping wall of the church with rafters and planks. The greatness of the danger rendered it impossible to remain quiet, whatever arts were adopted. That same night I removed from my apartment, which was joined to the church with the same beams and rafters, in such a manner, that if one fell, the other could not avoid being involved in the ruin. I have read that in Guiana, rocks and mountains have been undermined, walls thrown down, and people turned out of their habitations by ants, which I can easily believe having myself witnessed similar or even more incredible events.

"In Paraguay I was made thoroughly acquainted with the powers of ants. They are weak, and compared with many other insects, diminutive; but numbers, labor, and unanimity render them formidable, and endow them with strength superior to their size. In the plains, especially those near the Paraguay, I have seen ant-hills,

like stone parymids, three or more ells high, with a broad base, and composed of a solid material as hard as stone: these are the storehouses and castles of the ants, from the summits of which they discern sudden inundations, and safely behold the floating carcasses of less industrious animals. Elsewhere I have seen an immense plain, so covered with low ant-hills, that the horse could not move a step without stumbling. In the plains you may often observe a broad path, through which you would swear the legions of Xerxes might have passed. The Spaniards hollow out these pyramidal heaps, and use them for ovens, or reduce them to a powder, which, mixed with water, serves admirably to floor houses. Pavements of this kind resemble stone in appearance and hardness, and are said to prevent the breeding of fleas and other insects. But hear what mischief ants commit within doors. They flock in a long and almost endless company to the sacks of wheat, and in a journey uninterrupted by day or night (if there be a moon,) carry off by degrees some bushels. They will entirely strip fruit trees of their leaves, unless you twist a cow's tail round the trunk to hinder their ascent, and eat away the crops so completely that you would think they had been cut with a sickle. Moreover, ants of various kinds are extremely destructive both to vineyards and gardens, devouring vegetables and pulse to the very root. Set a young plant in the ground, and the next day you will seek it in vain. They refrain from pepper on account of its pungency. If you leave meat, either dressed or raw, in your apartment, you will soon find it blackened with swarms of ants. They devour all sorts of trash, the very carcasses of beetles, toads, and snakes. On returning to my apartment, I found a little bird which I kept in a cage devoured by ants. Nor do they abstain from the bodies of sleeping persons. In the dead of the night an army of ants will issue from the wall or pavement, get upon the bed, and unless you instantly make your escape, sting you all over. This happen so frequently in the Guarany colonies, that we were obliged to burn a candle at night; for lighted sheets of paper thrown upon the swarm are the only means of driving them away. The Portuguese have an old saying, that the ants are queens of Brazil. Certainly we have found them the sovereigns of Paraguay. There may be said to be more trouble in conquering these insects, than all the savages put together; for every contrivance hitherto devised serves only to put them to flight, not banish them effectually."

THE MOST ANCIENT DESCRIPTION OF VIRGINIA.

Extracted from "The Trve Travels, Adventvres and Observations of Captaine Iohn Smith, in Europe, Asia, Africke, and America." Published London 1629.

The Sixt Voyage, 1606. *to another part of Virginia, where now are planted our English Colonies, whom God increase and preserue: Discovered and described by Captaine Ihon Smith, sometimes Governour of the Countrey.*

By these former relations you may see what inconveniences still crossed those good intents, and how great a matter it was all this time to finde but a harbour, although there be so many. But this Virginia is a country in America betweene the degrees of 34. and 45. of the North latitude. The bounds thereof on the east side are the great ocean: on the south lyeth Florida: on the north Nova Francia: as for the west thereof, the limits are vnknowne. Of all this country we purpose not to speake, but onely of that part which was planted by the English men, in the yeare of our Lord, 1606. And this is vnder the degrees 37. 38. and 39. The temperature of this country doth agree well with English constitutions, being once seasoned to the country. Which appeared by this, that though by many occasions our people fell sicke; yet did they recover by very small meanes, and continued in health, though there were other great causes, not onely to haue made them sicke, but even to end their dayes, &c.

The sommer is hot as in Spaine; the winter cold as in France or England. The heat of sommer is in Iune, Iuly, and August, but commonly the coole breeses asswage the vehemency of the heat. The chiefe of winter is halfe December, Ianuary, February, and halfe March. The colde is extreame sharpe, but here the proverbe is true, that no extreame long continueth.

In the yeare 1607. was an extraordinary frost in most of Europe, and this frost was found as extreame in Virginia. But the next yeare for 8 or 10 dayes of ill weather, other 14 dayes would be as sommer.

The windes here are variable, but the like thunder and lightning to purifie the ayre, I haue seldome either seene or heard in Europe. From the southwest came the greatest gusts with thunder and heat. The northwest winde is commonly coole and bringeth faire weather with it. From the north is the greatest cold, and from the east and southeast as from the Bermudas, fogs and raines.

Sometimes there are great droughts, other times much raine, yet great necessitie of neither, by reason we see not but that all the raritie of needful fruits in Europe, may be there in great plentie, by the industry of men, as appeareth by those we there planted.

There is but one entrance by sea into this country, and that is at the mouth of a very goodly bay, 18 or 20 myles broad. The cape on the south is called Cape Henry, in honour of our most noble Prince. The land white hilly sands like vnto the Downes, and all along the shores great plentie of pines and firres.

The north Cape is called Cape Charles, in honour of the noble Duke of Yorke. The Isles before it, Smith's Isles, by the name of the discoverer. Within is a country that may haue the prerogatiue over the most pleasant places knowne, for large and pleasant navigable rivers: heaven and earth never agreed better to frame a place for mans habitation, were it fully manured and inhabited by industrious people. Here are mountaines, hils, plaines, valleyes, rivers and brookes, all running most pleasantly into a faire bay, compassed, but for the mouth, with fruitfull and delightsome land. In the bay and rivers are many isles both great and small, some woody, some plaine, most of them low and not inhabited. This bay lyeth north and south, in which the water floweth neare 200 myles and hath a channell, for 140 myles, of depth betwixt 6 and 15 fadome, holding a breadth for the most part 10 or 14 myles. From the head of the bay to the northwest, the land is mountanous, and so in a manner from thence by a southwest line;

so that the more southward, the farther off from the bay are those mountaines. From which fall certaine brookes which after come to fiue principall navigable rivers. These run from the northwest into the southeast, and so into the west side of the bay, where the fall of every river is within 20 or 15 myles one of the other.

The mountaines are of divers natures: for at the head of the bay the rockes are of a composition like mill stones. Some of marble, &c. And many peeces like christall we found, as throwne downe by water from those mountaines. For in winter they are covered with much snow, and when it dissolveth, the waters fall with such violence, that it causeth great inundations in some narrow valleys, which is scarce perceived being once in the rivers. These waters wash from the rocks such glistering tinctures, that the ground in some places seemeth as guilded, where both the rocks and the earth are so splendent to behold, that better iudgements then ours might haue beene perswaded, they contained more then probabilities. The vesture of the earth in most places doth manifestly proue the nature of the soyle to be lusty and very rich. The colour of the earth we found in diverse places, resembleth *bole armoniac*, *terra a sigillata*, and *Lemnia*, Fullers earth, marle, and divers and other such appearances. But generally for the most part it is a blacke sandy mould, in some places a fat slimy clay, in other places a very barren gravell. But the best ground is knowne by the vesture it beareth, as by the greatnesse of trees, or abundance of weeds, &c.

The country is not mountanous, nor yet low, but such pleasant plaine hils, and fertile valleyes, one prettily crossing another, and watered so conveniently with fresh brookes and springs, no lesse commodious, then delightsome. By the rivers are many plaine marishes, containing some 20, some 100, some 200 acres, some more, some lesse. Other plaines there are few, but onely where the salvages inhabit: but all overgrowne with trees and weeds, being a plaine wildernesse as God first made it.

On the west side of the bay, we sayd were 5 faire and delightfull navigable rivers. The first of those, and the next to the mouth of the bay hath his course from the west northwest. It is called Powhatan, according to the name of a principall countrey that lyeth vpon it. The mouth of this river is neare three myles in breadth, yet doe the shoules force the channell so neare the land, that a sarce will overshoot it at point blancke. It is navigable 150 myles, the shoules and soundings are here needlesse to be expressed. It falleth from rockes farre west in a country inhabited by a nation they call Monacans. But where it commeth into our discovery it is Powhatan. In the farthest place that was diligently observed, are falles, rockes, shoules, &c., which makes it past navigation any higher. Thence in the running downeward, the river is enriched with many goodly brookes, which are maintained by an infinit number of small rundles and pleasant springs that disperse themselues for the best service, as do the veines of a mans body. From the South there fals into it, first, the pleasant river of Apamatuck. Next more to the east are two small rivers of Quiyoughcohanocke. A little farther is a bay wherein falleth 3 or 4 prettie brookes and creekes that halfe intrench the inhabitants of Warraskoyac, then the river of Nansamund, and lastly the brooke of Chisapeack. From the north side is the river of Chickahamania, the backe river of Iames Town; another by the Cedar Isle, where we liued ten weekes vpon oysters, then a convenient harbour for fisher boats at Kecoughtan, that so turneth it selfe into bayes and creekes, it makes that place very pleasant to inhabit; their cornefields being girded therein in a manner as peninsulaes. The most of these rivers are inhabited by severall nations, or rather families, of the name of the rivers. They haue also over those some Governour, as their King, which they call Werowances. In a peninsula on the north side of this river are the English planted in a place by them called Iames Towne, in honour of the Kings most excellent Maiestie.

The first and next the rivers mouth are the Kecoughtans, who besides their women and children, haue not past 20 fighting men. The Paspaheghes (on whose land is seated Iames Towne, some 40 myles from the Bay) haue not past 40. The river called Chickahamania neare 250. The Weanocks 100. The Arrowhatocks 30. The place called Powhatan, some 40. On the south side this river the Appamatucks haue sixtie fighting men. The Quiyougcohanocks 25. The Nansamunds 200. The Chesapeacks 100. Of this last place the bay beareth the name. In all these places is a severall commander, which they call Werowance, except the Chickahamanians, who are governed by the priests and their assistants, or their elders called Caw-cawwassoughse. In sommer no place affordeth more plentie of sturgeon, nor in winter more abundance of foule, especially in the time of frost. I tooke once 52 sturgeons at a draught, at another 68. From the later end of May till the end of Iune are taken few, but yong sturgeons of two foot, or a yard long. From thence till the midst of September, them of two or three yards long and few others. And in 4 or 5 houres with one net were ordinarily taken 7 or 8; often more, seldome lesse. In the small rivers all the yeare there is good plentie of small fish, so that with hookes those that would take paines had sufficient.

Foureteene myles northward from the river Powhatan, is the river Pamavnkee, which is navigable 60 or 70 myles, but with catches and small barkes 30 or 40 myles farther. At the ordinary flowing of the salt water, it divideth it self into two gallant branches. On the south side inhabit the people of Youghtanund, who haue about 60 men for warres. On the north branch Mattapament, who haue 30 men. Where this river is divided, the country is called Pamavnkee and nourisheth neare 300 able men. About 25 myles lower on the north side of this river is Werawocomoco, where their great king inhabited when I was delivered him prisoner; yet there are not past 40 able men. Ten or twelue myles lower, on the south side of this river, is Chiskiack, which hath some 40 or 50 men. These, as also Apamatuck, Irrohatock, and Powhatan, are their great kings chiefe alliance, and inhabitants. The rest his conquests.

Before we come to the third river that falleth from the mountaines, there is another river (some 30 myles navigable) that commeth from the inland, called Payankatanke: the inhabitants are about 50 or 50 serviceable men.

The third navigable river is called Toppahanock. (This is navigable some 130 myles.) At the top of it inhabit the people called Mannahoacks amongst the mountaines, but they are aboue the place we described. Vpon this river on the north side are the people Cuttatawomen, with 30 fighting men. Higher are the Moraughtacunds, with 80. Beyond them Rapahanock with 100. Far aboue is another Cuttatawomen with 20. On the south is the pleasant seat of Nantaughtacund having 150 men. This river also, as the two former, is replenished with fish and foule.

The fourth river is called Patawomeke, 6 or 7 myles in breadth. It is navigable 140 myles, and fed as the rest with many sweet rivers and springs, which fall from the bordering hils. These hils many of them are planted, and yeeld no lesse plentie and varietie of fruit, then the river exceedeth with abundance of fish. It is inhabited on both sides. First on the south side at the very entrance is Wighcocomoco, and hath some 130 men, beyond them Sekacawone with 30. The Onawmanient with 100. And the Patawomekes more then 200. Here doth the river divide itselfe into 3 or 4 convenient branches. The greatest of the least is called Quiyough, trending northwest, but the river it selfe turneth northeast, and is still a navigable streame. On the westerne side of this bought is Tauxenent with 40 men. On the north of this river is Secowocomoco with 40. Somewhat further Potapaco with 20. In the east part is Pamacaeack with 60. After Moyowance with 100. And lastly, Nocotchtanke with 80. The river aboue this place maketh his passage downe a low pleasant valley overshaddowed in many places with high rocky mountaines; from whence distill innumerable sweet and pleasant springs.

The fift river is called Pawtuxunt, of a lesse proportion then rest; but the channell is 16 fadome deepe in some places. Here are infinit skuls of divers kindes of fish more then elsewhere. Vpon this river dwelt the people called Acquintanacksuak, Pawtuxunt, and Mattapanient. Two hundred men was the greatest strength that could be there perceived. But they inhabit together, and not so dispersed as the rest. These of all other we found most civill to giue intertainement.

Thirtie leagues northward is a river not inhabited, yet navigable; for the red clay resembling *bole Armoniack* we called it *Bolus*. At the end of the Bay where it is 6 or 7 myles in breadth, it divides it selfe into 4 branches, the best commeth northwest from among the mountaines, but though canows may goe a dayes iourney or two vp it, we could not get two myles vp it with our boat for rockes. Vpon it is seated the Sasquesahanocks: neare it north and by west runneth a creeke a myle and a halfe: at the head whereof the ebbe left vs on shore, where we found many trees cut with hatchets. The next tyde keeping the shore to seeke for some salvages, (for within thirtie leagues sayling, we saw not any, being a barren country,) we went vp another small river like a creeke 6 or 7 myle. From thence returning we met 7 canowes of the Massowomeks, with whom we had conference by signes, for we vnderstood one another scarce a word: the next day we discovered the small river and people of Tockwhogh trending eastward.

Having lost our grapnell among the rocks of Sasquesahanocks, we were then neare 200 myles from home, and our barge about two tuns, and had in it but twelve men to performe this discovery, wherein we lay about 12 weekes vpon those great waters in those vnknowne countries, having nothing but a little meale, oatemeale and water to feed vs, and scarce halfe sufficient of that for halfe that time, but what provision we got among the salvages, and such rootes and fish as we caught by accident, and Gods direction; nor had we a mariner nor any had skill to trim the sayles but two saylers and my selfe, the rest being gentlemen, or them were as ignorant in such toyle and labour. Yet necessitie in a short time, by good words and examples, made them doe that that caused them ever after to feare no colours. What I did with this small meanes I leaue to the reader to iudge, and the mappe I made of the country, which is but a small matter in regard of the magnitude thereof. But to proceed, 60 of those Sasquesahanocks came to vs with skins, bowes, arrows, targets, beads, swords and tobacco pipes for presents. Such great and well proportioned men are seldome seene, for they seemed like giants to the English, yea and to the neighbours, yet seemed of an honest and simple disposition, with much adoe restrained from adoring vs as Gods. Those are the strangest people of all those countries, both in language and attire; for their language it may well beseeme their proportions, sounding from them, as a voyce in a vault. Their attire is the skinnes of beares and woolues; some haue cassacks made of beares heads and skinnes, that a mans head goes through the skinnes neck, and the eares of the beare fastened to his shoulders, the nose and teeth hanging downe his breast, another beares face split behind him, and at the end of the nose hung a pawe, the halfe sleeues comming to the elbowes were the neckes of beares, and the armes through the mouth with pawes hanging at their noses. One had the head of a wolfe hanging in a chaine for a jewell, his tobacco pipe three quarters of a yard long, prettily carued with a bird, a deere, or some such devise at the great end, sufficient to beat out ones braines: with bowes, arrowes, and clubs, sutable to their greatnesse. These are scarce knowne to Powhatan. They can make neare 600 able men, and are pallisadoed in their townes to defend them from the Massawomekes their mortall enemies. Fiue of their chiefe Werowances came aboord vs and crossed the bay in their barge. The picture of the greatest of them is signified in the mappe; the calfe of whose leg was three quarters of a yard about, and all the rest of his limbes so answerable to that proportion, that he seemed the goodliest man we ever beheld. His hayre, the one side was long, the other shore close with a ridge over his crowne like a cocks combe. His arrowes were fiue quarters long, headed with the splinters of a white christall-like stone, in forme of a heart, an inch broad, and an inch and a halfe or more long. These he wore in a woolues skinne at his backe for his quiver, his bow in the one hand and his clubbe in the other, as is described.

On the east side the bay, is the river Tockwhogh, and vpon it a people that can make 100 men, seated some seaven myles within the river: where they haue a fort very well pallisadoed and mantelled with barkes of trees. Next them is Ozinies with sixty men. More to the south of that east side of the bay, the river Rapahanock, neere

vnto which is the river Kuscarawaock. Vpon which is seated a people with 200 men. After that, is the river Tants Wighcocomico, and on it a people with 100 men. The people of those rivers are of little stature, of another language from the rest, and very rude. But they on the river Acohanock with 40 men, and they of Accomack 80 men, doth equalize any of the territories of Powhatan, and speake his language, who over all those doth rule as king.

Southward we went to some parts of Chawonock and the Mangoags to search for them left by Mr. White. Amongst those people are thus many severall nations of sundry languages, that environ Powhatans territories. The Chawonockes, the Mangoags, the Monacans, the Mannahokes, the Masawomekes, the Powhatans, the Sasquesahanocks, the Atquanachukes, the Tockwoghes, and the Kuscarawaockes. All those not any one vnderstandeth another but by interpreters. Their severall habitations are more plainly described by this annexed mappe, which will present to the eye, the way of the mountaines, and current of the rivers, with their severall turnings, bayes, shoules, isles, inlets, and creekes, the breadth of the waters, the distances of places, and such like. In which mappe obserue this, that as far as you see the little crosses on rivers, mountaines, or other places haue beene discovered; the rest was had by information of the salvages, and are set downe according to their instructions.

Thus haue I walkt a wayless way, with vncouth pace.
Which yet no christian man did ever trace:
But yet I know this not affects the minde,
Which eares doth heare; as that which eyes doe finde.

Of such things which are naturally in Virginia, and how they vse them.

Virginia doth afford many excellent vegetables, and liuing creatures, yet grasse there is little or none, but what groweth in low marishes: for all the countrey is overgrowne with trees, whose droppings continually turneth their grasse to weeds, by reason of the rancknes of the ground, which would soone be amended by good husbandry. The wood that is most common is oke and walnut; many of their okes are so tall and straight, that they will beare two foote and a halfe square of good timber for 20 yards long. Of this wood there is two or three severall kinds. The acornes of one kinde, whose barke is more white then the other, and somewhat sweetish, which being boyled, at last affords a sweet oyle, that they keepe in gourds to annoint their heads and ioynts. The fruit they eate made in bread or otherwise. There is also some elme, some blacke walnut tree, and some ash: of ash and elme they make sope ashes. If the trees be very great, the ashes will be good, and melt to hard lumps, but if they be small, it will be but powder, and not so good as the other. Of walnuts there is 2 or 3 kindes; there is a kinde of wood we called cypres, because both the wood, the fruit, and leafe did most resemble it, and of those trees there are some neare three fadome about at the foot, very straight, and 50, 60, or 80 foot without a branch. By the dwelling of the salvages are some great mulbery trees, and in some parts of the countrey they are found growing naturally in prettie groues. There was an assay made to make silke, and surely the wormes prospered excellent well, till the master workeman fell sicke; during which time they were eaten with rats.

In some parts were found some chesnuts whose wild fruit equalize the best in France, Spaine, Germany, or Italy. Plums there are of three sorts. The red and white are like our hedge plums, but the other, which they call *putchamins*,* grow as high as a palmeta: the fruit is like a medler; it is first greene, then yellow, and red when it is ripe; if it be not ripe, it will draw a mans mouth awry, with much torment, but when it is ripe it is as delicious as an apricot.

They haue cherries, and those are much like a damson, but for their tastes and colour we called them cherries. We saw some few crabs, but very small and bitter. Of vines great abundance in many parts that climbe the toppes of highest trees in some places, but these beare but few grapes. Except by the rivers and salvage habitations, where they are not overshadowed from the sunne, they are covered with fruit, though never pruined nor manured. Of those hedge grapes we made neere twentie gallons of wine, which was like our French Brittish wine, but certainly they would proue good were they well manured. There is another sort of grape neere as great as a cherry, this they call *messamins*, they be fatte, and the iuyce thicke. Neither doth the taste so well please when they are made in wine. They haue a small fruit growing on little trees, husked like a chesnut, but the fruit most like a very small acorne. This they call *chechinquamins*, which they esteeme a great daintie. They haue a berry much like our gooseberry, in greatnesse, colour, and tast; those they call rawcomens, and doe eat them raw or boyled. Of these naturall fruits they liue a great part of the yeare, which they vse in this manner: the walnuts, chesnuts, acornes, and *chechinquamins* are dryed to keepe. When they need walnuts they breake them between two stones, yet some part of the shels will cleaue to the fruit. Then doe they dry them againe vpon a mat over a hurdle. After they put it into a morter of wood, and beat it very small: that done, they mixt it with water, that the shels may sinke to the bottome. This water will be coloured as milke, which they call *pawcohiccora*, and keepe it for their vse. The fruit like medlers they call putchamins, they cast vpon hurdles on a mat, and preserue them as pruines. Of their chesnuts and chechinquamins boyled, they make both broath and bread for their chiefe men, or at their greatest feasts. Besides those fruit trees, there is a white popular, and anather tree like vnto it, that yeeldeth a very cleare and an odoriferous gumme like turpentine, which some called balsom. There are also cedars and saxafras trees. They also yeeld gummes in a small proportion of themselues. Wee tryed conclusions to extract it out of the wood, but nature afforded more then our arts.

In the watry valleyes groweth a berry which they call *ocoughtanamnis* very much like vnto capers. These they dry in sommer. When they eat them they boile them neare halfe a day; for otherwise they differ not much from poyson. *Mattoum* groweth as our bents. The seed is not much vnlike to rie, though much smaller. This they vse for a daintie bread buttered with deare suet.

* Persimmons. Ed.

During sommer there are either strawberries, which ripen in Aprill, or mulberries which ripen in May and Iune. Raspises, hurts; or a fruit that the inhabitants call maracocks, which is a pleasant wholesome fruit much like a lemond. Many herbes in the spring are commonly dispersed throughout the woods, good for brothes and sallets, as violets, purslain, sorrell, &c. Besides many we vsed whose names we know not.

The chiefe root they haue for food is called Tockawhoughe. It groweth like a flagge in marishes. In one day a salvage will gather sufficient for a weeke. These rootes are much of the greatnesse and taste of potatoes. They vse to cover a great many of them with oke leaues and ferne, and then cover all with earth in the manner of a colepit; over it, on each side, they continue a great fire 24 houres before they dare eat it. Raw it is no better then poyson, and being rosted, except it be tender and the heat abated, or sliced and dryed in the sunne, mixed with sorrell and meale or such like, it will prickle and torment the throat extreamely, and yet in sommer they vse this ordinarily for bread.

They haue another roote which they call Wighsacan: as th'other feedeth the body, so this cureth their hurts and diseases. It is a small root which they bruise and apply to the wound. Pocones is a small root that groweth in the mountaines, which being dryed and beate in powder, turneth red. And this they vse for swellings, aches, annointing their ioynts, painting their heads and garments. They account it very precious, and of much worth. Musquaspen is a roote of the bignesse of a finger, and as red as bloud. In drying, it will wither almost to nothing. This they vse to paint their mattes, targets, and such like.

There is also pellitory of Spaine, sasafrage, and divers other simples, which the apothecaries gathered, and commended to be good, and medicinable.

In the low marishes grow plots of onyons, containing an acre of ground or more in many places; but they are small, not past the bignesse of the top of ones thumbe.

Of beasts the chiefe are deere, nothing differing from ours. In the deserts towards the heads of the rivers, there are many, but amongst the rivers few. There is a beast they call Aroughcun,* much like a badger, but vseth to liue on trees as squirrels doe. Their squirrels some are neare as great as our smallest sort of wilde rabbits, some blackish or blacke and white, but the most are gray.

A small beast they haue they call Assapanick, but we call them flying squirrels, because spreading their legs, and so stretching the largenesse of their skins, that they haue beene seene to fly 30 or 40 yards. An opossom hath a head like a swine, and a taile like a rat, and is of the bignesse of a cat. Vnder her belly shee hath a bagge, wherein she lodgeth, carrieth, and suckleth her young. A Mussascust† is a beast of the forme and nature of our water rats, but many of them smell exceeding strongly of muske. Their hares no bigger then our conies, and few of them to be found.

Their beares are very little in comparison of those of Muscovia and Tartaria. The beaver is as big as an ordinary water dog, but his legs exceeding short. His forefeete like a dogs, his hinder feet like a swans. His taile somewhat like the forme of a racket, bare without haire, which to eat the salvages esteeme a great delicate. They haue many otters, which as the beavers they take with snares, and esteeme the skins great ornaments, and all of those beasts they vse to feed when they catch them. An Vtchunquoyes is like a wilde cat. Their foxes are like our silver haired conies, of a small proportion, and not smelling like those in England. Their dogges of that country are like their woolues, and cannot barke, but howle, and the woolues not much bigger then our English foxes. Martins, powlecats, weesels, and minkes we know they haue, because we haue seene many of their skinnes, though very seldome any of them aliue. But one thing is strange, that we could never perceiue their vermine destroy our hennes, egges, nor chickens, nor doe any hurt, nor their flyes nor serpents any way pernicious, whereas in the south parts of America they are alwayes dangerous, and often deadly.

Of birds the eagle is the greatest devourer. Hawkes there be of divers sorts, as our falconers called them: sparrow-hawkes, lanarets, goshawkes, falcons, and osperayes, but they all prey most vpon fish. Their partridges are little bigger than our quailes. Wilde turkies are as bigge as our tame. There are woosels or blackbirds with red shoulders, thrushers and divers sorts of small birds, some red, some blew, scarce so bigg as a wrenne, but few in sommer. In winter there are great plentie of swans, cranes, gray and white with blacke wings, herons, geese, brants, ducke, wigeon, dotterell, oxeies, parrats, and pigeons. Of all those sorts great abundance, and some other strange kinds, to vs vnknowne by name. But in sommer not any, or a very few to be seene.

Of fish we were best acquainted with sturgeon, grampus, porpus, seales, stingraies, whose tailes are very dangerous. Bretts, mullets, white salmonds, trowts, soles, plaice, herrings, conyfish, rockfish, eeles, lampreys, catfish, shades, pearch of three sorts, crabs, shrimps, crevises, oysters, cocles, and muscles. But the most strange fish is a small one, so like the picture of St George his dragon, as possible can be, except his legs and wings, and the toadfish, which will swell till it be like to burst, when it commeth into the ayre.

Concerning the entrailes of the earth, little can be said for certaintie. There wanted good refiners; for those that tooke vpon them to haue skill this way, tooke up the washings from the mountaines, and some moskered shining stones and spangles which the waters brought downe, flattering themselues in their owne vaine conceits to haue beene supposed what they were not, by the meanes of that ore, if it proued as their arts and iudgments expected. Onely this is certaine, that many regions lying in the same latitude, afford mines very rich of divers natures. The crust also of these rocks would easily perswade a man to beleeue there are other mines then yron and steelle, if there were but meanes and men of experience that knew the mine from spar.

Of their planted fruits in Virginia, *and how they vse them.*

They divide the yeare into fiue seasons. Their winter some call, popanow, the spring, cattapeuk, the sommer, cohattayough, the earing of their

* Rackoon.—Ed. † Muskrat.—Ed.

corne, nepinough, the harvest and fall of leafe, taquitock. From September vntill the midst of November are the chiefe feasts and sacrifice. Then haue they plentie of fruits as well planted as naturall, as corne, greene and ripe, fish, fowle, and wilde beasts exceeding fat.

The greatest labour they take, is in planting their corne, for the country naturally is overgrowne with wood. To prepare the ground they bruise the barke of the trees neare the root, then doe they scortch the roots with fire that they grow no more. The next yeare with a crooked peece of wood they beat vp the weeds by the rootes, and in that mould they plant their corne. Their manner is this. They make a hole in the earth with a sticke, and into it they put foure graines of wheate* and two of beanes. These holes they make foure foote one from another; their women and children do continually keepe it with weeding, and when it is growne middle high, they hill it about like a hop-yard.

In April they begin to plant, but their chiefe plantation is in May, and so they continue till the midst of Iune. What they plant in April they reape in August; for May in September, for Iune in October: every stalke of their corne commonly beareth two eares, some three, seldome any foure, many but one, and some none, Every eare ordinarily hath betwixt 200 and 500 graines. The stalke being greene hath a sweet iuice in it, somewhat like a sugar cane, which is the cause that when they gather their corne greene, they sucke the stalkes: for as we gather greene pease, so doe they their corne being greene, which excelleth their old. They plant also pease they call Assentamens, which are the same they call in Italy, Fagioli. Their beanes are the same the Turkes call garnanses, but these they much esteeme for dainties.

Their corne they rost in the eare greene, and bruising it in morter of wood with a polt, lap it in rowles in the leaues of their corne, and so boyle it for a daintie. They also reserue that corne late planted that will not ripe, by roasting it in hot ashes, the heat thereof drying it. In winter they esteeme it being boyled with beanes for a rare dish, they call pausarowmena. Their old wheat they first steepe a night in hot water, in the morning pounding it in a mortar. They vse a small basket for their temmes, then pound againe the great, and so separating by dashing their hand in the basket, receiue the flower in a platter made of wood, scraped to that forme with burning and shels. Tempering this flower with water, they make it either in cakes, covering them with ashes till they be baked, and then washing them in faire water, they drie presently with their owne heat: or else boyle them in water, eating the broth with the bread, which they call ponap. The groutes and peeces of the cornes remaining, by fanning in a platter or in the wind, away the branne, they boyle three or four houres with water, which is an ordinary food they call vstatahamen.† But some more thriftie then cleanly, doe burne the corne of the eare to powder, which they call pungnough, mingling that in their meale, but it never tasted well in bread, nor broth. Their fish and flesh they boyle either very tenderly, or boyle it so long on hurdles over the fire, or else after the Spanish fashion, putting it on a spit, they turne first the one side, then the other, till it be as drie as their ierkin beefe in the West Indies, that they may keepe it a moneth or more without putrifying. The broth of fish or flesh they eat as commonly as the meat.

In May also amongst their corne they plant pumpeons, and a fruit like vnto a muske mellon, but lesse and worse, which they call macocks. These increase exceedingly, and ripen in the beginning of Iuly, and continue vntil September, They plant also maracocks, a wild fruit like a lemmon, which also increase infinitely. They begin to ripe in September, and continue until the end of October, when all their fruits be gathered. Little els they plant, and this is done by their women and children; neither doth this long suffice them, for neare three parts of the yeare, they onely obserue times and seasons, and liue of what the country naturally affordeth from hand to mouth, &c.

The Commodities in Virginia, *or that may be had by Industrie.*

The mildness of the ayre, the fertilitie of the soyle, and situation of the rivers are so propitious to the nature and vse of man, as no place is more convenient for pleasure, profit, and mans sustenance, vnder that latitude or climat. Here will liue any beasts, as horses, goats, sheepe, asses, hens, &c. as appeared by them that were carried thether. The waters, isles, and shoales, are full of safe harbours for ships of warre or merchandize, for boats of all sorts, for transportation or fishing, &c. The bay and riuers have much marchantable fish, and places fit for salt coats, building of ships, making of iron, &c.

Muscovia and Polonia doe yearly receiue many thousands, for pitch, tarre, soap-ashes, rosen, flax, cordage, sturgeon, masts, yards, wainscot, firres, glasse, and such like; also Swethland for iron and copper. France in like manner, for wine, canvas and salt. Spaine as much for iron, steele, figges, reasons, and sackes. Italy with silkes and velvets consumes our chiefe commodities. Holland maintaines it selfe by fishing and trading at our owne doores. All these temporize with other for necessities, but all as vncertaine as peace or warres. Besides the charge, travell, and danger in transporting them, by seas, lands, stormes, and pyrats. Then how much hath Virginia the prerogatiue of all those flourishing kingdomes, for the benefit of our land, when as within one hundred myles all those are to be had, either ready provided by nature, or else to be prepared, were there but industrious men to labour. Onely of copper we may doubt is wanting, but there is good probabilitie that both copper and better minerals are there to be had for their labour. Other countries haue it. So then there is a place, a nurse for souldiers, a practise for mariners, a trade for marchants, a reward for the good, and that which is most of all, a businesse (most acceptable to God) to bring such poore infidels to the knowledge of God and his holy gospell.

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* Indian Corn.—Ed. † Hominy.—Ed.

PAPER VENEERING.

We yesterday examined an elegant piece of furniture veneered with marble paper, in imitation of rose wood. The imitation was so perfect and the

veneering so exact, that an experienced painter was unable to discover that it was not grained with paint, though he considered it almost impossible to shade and blend colors in such a beautiful manner. The paper was from the manufactory of Messrs. S. C. & E. Mann, of this town. They have brought the manufacture of colored marble paper to a higher state of perfection than any establishment in the United States. This plan of veneering furniture, we think, will prove a very useful improvement. It combines three very desirable qualities—elegance, durability and cheapness. A common pine table can be covered, in imitation of rose wood, for $1 50, in a style that would defy the most skilful painter in the world to equal. It is the opinion of cabinet makers that it will wear much longer than common veneering. A piece of furniture finished in this style may be examined at the Norfolk Bookstore in a few days. —*Dedham Patriot.*

CURE FOR BLIGHT OF PEAR TREES.

The discase, termed blight, which six or eight years ago, as also in 1802 to 1808, destroyed many of our pear trees, is again, we learn, making its appearance. We have been of opinion that the evil arises from a minute insect, which preys upon the inner bark. An insect of this kind, almost imperceptible to the naked eye, has been known to destroy forests of the larch in Germany. Our opinion has been much strengthened by a conversation with Aaron Thorp, Esq., who finding his trees affected, has made trial of various applications, without success, until he has found, he thinks, an effectual cure, in spirits of turpentine. He applies it on and about the diseased part, in its unadulterated state, with a brush.—*N. E. Farm.*

DEMAND FOR RAIL ROAD IRON.

Bills have been obtained this session of Parliament for nearly 1100 miles of road, which will require for rails, chairs, carriages and other works, at least 220,000 tons of iron, independent of the iron wanted for roads, for which bills had been previously obtained, and which are now in active preparation, which will require about 70,000 tons, making a total of about 290,000, which will probably be supplied in the next four years. To this must be added what will be required for several very extensive ones which are now in course of survey, and for which bills will be solicited in the next session of Parliament. When the iron required for rail roads in this country is added to what will be required for rail roads now in actual progress in the United States, and on the continent of Europe, we think the iron masters of this country may fairly look forward to a greatly increased demand for their produce during the next few years.—*English Paper.*

NEW DISCOVERY.

We have seen this week at Leeds, a specimen of bleached flax, prepared by Mr. Harwood, a chemist, of York, which appears to us as presenting a decided improvement in the manufacture of that article. It has created a great sensation amongst the manufacturers, and has been taken for silk. It is capable of being manufactured into the finest thread for the construction of veils, lace, cambric, and will supersede those articles of French manufacture. The texture is most beautiful—we never saw anything equal to it; and we have no doubt that, if properly brought into notice, the discovery will prove a national benefit, and introduce quite a revolution in those articles of trade.—*Doncaster (Eng.) Chronicle.*

THE MANUFACTURE OF SILK.

A very important improvement has been made in the silk-loom at Manchester, which is likely to operate very favorably upon the manufacture of this valuable article of trade, and may be the means of transferring a very large portion of it from France and Italy to this country. It is now perfectly clear that steam power may be applied with the greatest advantage to the silk loom, which has heretofore been worked by hand only; and a young girl may weave, with this improvement, as much silk in a day as can be woven by two men upon the present plan. The new loom occupies but little more than half the space required by the one in common use, as all the apparatus connected with the weights is removed, and a spring substituted, which performs the work with much greater precision than can be wrought by weights.—*Eng. Paper.*

REPORT ON THE NAVIGATION OF THE ROANOKE.

September 15, 1836.

At a meeting of the citizens of Clarksville, held this day, Dr. S. H. Harris was called to the Chair, and Mr. N. C. Read appointed Secretary.

Mr. Tucker Carrington, who had been appointed, at a previous meeting to examine the Connecticut and other rivers in the north, for the purpose of ascertaining the probable practicability of successful steamboat navigation on the Roanoke, Dan, and Staunton Rivers, submitted his report.

After the report was read, on motion, it was resolved, that Mr. Carrington be requested to furnish a copy of his report, and that it be forwarded to the editor of the Farmer's Register, with a request that he would publish it in his paper.

On motion, it was resolved, that the citizens of Clarksville, tender their thanks to Mr. Carrington for the prompt and able manner in which he has discharged the duties assigned him.

S. H. Harris, *Chairman.*

N. C. Read, *Secretary.*

REPORT.

The subject of attempting to navigate the Roanoke with steamboats of shallow draught, having been brought before the Board of Directors of the Roanoke Navigation Company, at their last spring's meeting, by a delegation of the citizens of Clarksville—that board very promptly responded to the application, by ordering an engineer to be employed, who should examine the river, with a view to the practicability of effecting this important object, and report to them at the meeting of the directors in November ensuing. In addition to this highly important step, they appointed one of the members of their own body,

(Mr. E. B. Hicks of Brunswick,) to visit the northern rivers, where it was understood these boats on shallow and swift water were in successful operation, to make such examinations, and collect such information, as would better enable them to move in this interesting enterprise. That gentleman addressed a letter to some of the citizens of Clarksville, suggesting the importance of appointing some one from that place, to accompany and aid him in the laborious work assigned him. The meeting which was called on that occasion, resulted in the passage of a unanimous resolution that the appointment be made, and that appointment fell on myself. We set out about the middle of June last, and reached the City of Washington a short time before the adjournment of Congress; there sought and procured an acquaintance with the members from the states of Massachusetts and Connecticut, and from them, obtained letters of introduction to all such persons, on the line of our contemplated travel, as would be likely to afford us any aid in the business with which we were charged. Thus prepared, we left Washington; and in a few days we were on the banks of the Connecticut River, which, we were informed, offered the best means of information on this subject, and which we determined to make the scene of our examinations and investigations. My friend, Mr. Hicks, has done no more than justice to the gentlemen whose names he has introduced, in terms of compliment, in a report lately addressed, by him, to the Superintendent of the Roanoke Navigation Company on this subject. They received us not only as fellow-citizens of the same country and government, but with that liberal spirit of patriotism, and extended usefulness, which seeks to shed upon others those high advantages, and superior lights, which themselves possessed. And although every man seems to have his business and employment, yet every thing was made subordinate to the duty of affording us that attention which, as strangers, and that aid which as explorers, we so much needed. In fact, we too little know, and too little appreciate our Yankee brethren.

On reaching Hartford, where the use of steamboats of light draught commences, we determined to remain a few days, and collect, from conversation with the intelligent men of the place, all the information and important facts we could. Here we made the acquaintance of Alfred Smith, Esq. President of the Connecticut Navigation Company, and who personally superintended and aided in the surveys of that river, and all the works upon it. Alfred Smith is a man of clear strong head, of a reflecting and investigating cast of mind, and well stored with that sort of information, which such a mind is apt to acquire—with feelings which at the same time they do not hurry him into the incautious extravagance of the enthusiast, yet do not suffer him to linger far in rear of the spirit of the age in which he lives. With a character stainless and irreproachable, he deservedly stands high in the confidence of his countrymen. From such a source, we could not fail to learn much that was valuable, and entirely to be relied upon. From him, we obtained all the information which could be had from mere conversation, and much to aid and guide us in our subsequent examinations. From Hartford to Springfield, a distance of 26 miles, the steamboat Massachusetts, of 35 horse power, daily plies each way; descending in the morning from Springfield to Hartford, and returning in the evening to the former place. It was built by Thos. Blanchard, about 4 years ago, at his own individual risk; so little sanguine were his fellow-citizens of his success, that few or none would join him. The two great objects to be obtained, in order to secure success, are the procurement of great power and shallow draught; for where the water is rapid and calls for power in the boat to ascend it, it is usually shoaly and must have a shallow float in order to pass without hanging. In the building of craft of every description, the hull is generally made of strong, heavy timbers, it being the foundation upon which all the superstructure rests, and by which it is supported: and of necessity, if the vessel be of much burden, must sink deep in the water. But in the boat Massachusetts, a skill in construction and design is displayed, which secures a good burden, without forfeiting the light draught. It is built upon the principle of a suspended bridge, in which two strong arches or circles of oak timber are thrown over, and the decks, cabins, and hull, hang beautifully and successfully upon it; and thus all the under-works, being supported, and not supporting, can be made very light and thin, and secures to the boat a very shallow draught. This is a design, for which Mr. Blanchard has procured a patent; and to show that no strength in the boat is forfeited by this construction, it is only necessary to mention, that it has been running over rocks, sands and rapids, for four years, with great profit to the owners, without one dollar being necessary for repairs. This boat is upon the high pressure principle, 97½ feet long, 13½ wide, and draws 22 inches water with a freight of from 40 to 50 passengers, and their baggage. Its travel being entirely by day light, there are no accommodations for lodging; but two quite spacious cabins, one for ladies, and one for gentlemen, and an upper deck, where passengers either sit or promenade at pleasure. The wheel is in the stern; one having been tried with wheels on the sides, and found not to answer, on account of the narrow passes between the rocks, which broke and displaced the paddles. The cost of the above boat, was $7000, and the charge for crew per month, was $100; fuel would add something to the expense, but nothing material. Its gross income is from $75 to $100 per day, and of course it is first rate property, as well as a great public convenience.

Having thus given some description of the plan and principle upon which the boat is constructed, it follows in order to give some account of the water upon which it is used, to enable you to form an opinion as to the possibility of applying such boats to any practical purposes on the Roanoke, Dan, and Staunton. Steamboats which have sufficient size to encounter, with ease and safety, the swells and storms of Long Island Sound, come without difficulty to Hartford. From Hartford up, the navigation is much interrupted by falls, shallows, and shifting bars of sand, which entirely forbid the ascent of boats of such burden as are used below. The distance from Hartford to the foot of Enfield Falls is 12 miles, and in all this stretch, the river is smooth and gentle in its current, with not more than three inches fall to the mile. From the head of the same fall, to Spring-

field, a distance of nine miles, the current again becomes smooth, and unbroken by impediments of any kind, with about the same fall as below the rapids above mentioned. Enfield Falls, which lie opposite the little village of Enfield, and hence derive the name, are from 5 to 5½ miles from foot to head; but there being 1½ of slack water between the upper and lower fall, the rapid water is 3½ miles in extent. This fall is 10 feet to the mile, by actual measurement. To the eye, this fall is remarkably well distributed; but is said to consist of a succession of pitches or strains, at different intervals and of different strength, and to all of which, as with us, the boatmen have given some name, as Mad Tom, &c. Over this fall the steamboat Massachusetts passes with the greatest ease, —shifting its direction frequently across the current, to avoid the rocks and bars which make their position known to the practised eye of the pilot by signs on the surface—in 1 hour and 15 minutes. The rocks and sand in the bottom of the river, are visible from the deck of the boat in nearly the entire extent of the fall, and in many places the stream becomes so shallow, that the smallest pebble may be seen with the utmost distinctness. The velocity of the water on Enfield Falls having been ascertained by Mr. Blanchard, by actual measurement, to be between 8 and 9 miles an hour, he came to the conclusion, that a supervening power of 12 miles an hour (which is the power of the steamer Massachusetts upon water at rest,) would overcome it at the rate of 3 miles an hour. His experiment has demonstrated the correctness of his reasoning, and displayed a triumph of genius and art over the obstacles of nature. In descending, little or no steam is used: the progress of the boat on the falls, being as rapid without it, as is consistent with safety and accurate steering, for which purpose a long bow-oar is employed, which perfectly commands the direction of the boat.

I will now proceed to compare the obstacles, which have been overcome by the power of steam on the Connecticut River, and the difficulties to be surmounted in the Roanoke, in order to have the same success. It is unnecessary for me to go very minutely into details on this important branch of the subject. The statistics on this point, have been so clearly set forth in the report of E. B. Hicks, Esq. to the Superintendent of the Roanoke Navigation Company, published in the August No. of the Farmers' Register, and the encouraging fact, that success is within our reach, so clearly derivable from the premises, that it is almost needless for me to do more than refer you to that very clear and circumstantial document. It will be remembered that the average fall per mile on the Enfield Falls is 10 feet; while the greatest amount of fall in any mile on the Roanoke, between Clarksville and Rock Landing, is 11.1 feet, and in no other mile does it exceed 8 feet and a small fraction. And admit that the greatest possible success has been reached upon this subject, (of which, I have no idea,) and that 10 feet to the mile is the greatest amount of obstacle that can be overcome by steam—this point, Eaton's Falls, is below the intersection of the Gaston Rail Road with the Roanoke, and the improvement of the river, and the consequent use of steamboats to that point, would immediately result in important benefits to the valley of the Roanoke, and to a much wider extent of country which would then seek the river, as an outlet for their produce. But I would not stop here: I believe this improvement is yet in its infancy—otherwise it is the first the world has ever known, which reached its summit at the first stride. I believe the world is yet to be farther astonished and improved, by bolder efforts and more complete triumphs of art and mechanical skill. Whether the power of steam can overcome a current of 10 feet per mile, depends much upon the manner in which that fall is distributed. The report made by the engineer, to the Board of Public Works of Virginia preparatory to the improvement of the Roanoke is silent on this head; and for the purposes of steam navigation, it is a fact all-important to know. If a fall of 4 feet to the mile, is all in one pitch, its ascent is impracticable for steamboats constructed for shallow draught. Whereas a fall of 10 feet per mile, well distributed through the mile can be overcome with ease. Wherever then these hard strains occur, they must be distributed by art, or passed around by lock and canal.

For the purposes of towing freight boats, two or three steam tow-boats are in use on the Connecticut—that number being found sufficient for its trade. They ply from Hartford to any point up the river, to which freight is destined. They are of 20 horse power, and ascend the river at the rate of 2½ miles an hour, against a 1½ miles current, having in tow, 5 freight boats of 30 tons each. Around Enfield Falls there is a canal and locks, through which the steam tow-boats and freight boats pass. At Willimansett Falls, which is about 8 miles above Springfield, which is a short fall of about half a mile, the boats are carried up by the power of horses or oxen, by means of a windlass, with ease and despatch. The descent at this point is 9 feet to the mile. We were informed by Mr. Cuvier, superintendent and manager of the steam tow-boats, that one of the boats once passed that fall having 20 tons in tow. At Hadley Falls, the descent is 50 feet in 2½ miles; but the fall is chiefly in one pitch, directly opposite the little manufacturing village of Hadley, affording fine power for driving machinery. Here again there is a canal with locks, through which all the freight must pass. From Hadley to Miller's Falls, a distance of 35 miles, there is but little fall; but the navigation is much annoyed by shifting bars and new accumulations of sand and gravel. Beyond this point, the navigation by steam has never been carried, owing, it is thought, more to a want of inducement, than any doubts about its success.

I have thus given you a succinct history of the various obstructions to the navigation of that river for a distance of seventy miles above Hartford, and the means by which each has been overcome. The cost of the improvement from Hartford to Miller's Falls is said to have been between 3 and $400,000. And if the public spirit of the little state of Connecticut, with an extent of territory not larger than the counties touching the Roanoke from Weldon to Danville, with agricultural resources not half equal to the same district, can accomplish so much, why should the people of the extended and fertile valley of the Roanoke and its tributaries, remain longer slothful and inactive? This is an inquiry which directs itself peculiarly and pointedly to the

members of the Roanoke directory, to whom is committed the important trust of presiding over the improvement of that river. Recent movements in this part of the state, on the subject of internal improvement, should awaken your zeal, and quicken your efforts. What means the scheme of constructing a rail road from Evansham to Danville, and thence upon the ridge which nearly overlooks your river, to the same point of termination with yourselves? It means, clearly, that the river in its present condition, and with the present means of conveying produce to market, does not meet the public demands. What means the Rail Road Convention lately held at Charlotte Court-house, to take into consideration the policy and practicability of penetrating the Roanoke country with a rail road, from Petersburg or Richmond to Danville? It is another voice of discontent, to which you cannot turn a deaf ear, and which speaks to you in language which you cannot misunderstand; and which, if you have that share of public spirit which the place you fill would seem to indicate, you cannot misapply. It means that you must arouse yourselves to more extended views and bolder reaches for the public good, or the share of trade which now descends your river, will seek a vent, by some surer and more expeditious route. We, the citizens of Clarksville, have asked you for an object in which we have the concurrence of every reflecting man in the valley of the Roanoke. A member of your own body tells you, (and we presume from his opportunities, he speaks understandingly) that the thing is practicable. You have 40 efficient hands, accustomed to, and skilful in work of this sort; you will find a willing spirit, and a helping hand, in every stock and property holder upon the whole line of the Roanoke; and we have as strong a claim upon the surplus revenue, (which has lately fallen to the share of our state, and which doubtless will ultimately be distributed for purposes of this sort,) as any portion of Virginia. In the full view of means of this sort, why fear the effort? Think you, if steam boats were plying, successfully, from Danville to Weldon, and from the upper regions of the Staunton to the same point, we should ever have heard of a rail road from Danville to Weldon, or that a rail road convention would have ever assembled at Charlotte Court-house? Instead of this, there would have been rail roads from the Yadkin to Clarksville, from Evansham to Danville, and from numerous other points, all seeking, upon the waters of the Roanoke, a cheap and easy outlet to the ocean.

T. CARRINGTON.

From the Ohio Farmer.

RAISING CHICKINGS.

The subject upon which I am about to write, may excite a smile upon the faces of some, but if I succeed even in rendering a small service to any, the object will be accomplished. Possibly I may throw out a few hints that may be useful in increasing the number and quality of an animal that is so universally made to conduce to the luxury of the table, and the proper sustenance of the human system.

In the first place, then, I would advise those interested to procure for themselves a good breed of fowls. The pair I sent you last fall, I consider nearer to profection, in all respects, than those of any other breed. I call them the ostrich breed, from their strong resemblance, when about half grown, to that famous bird. They are large—their habits are very domestic—they lay well—set well—hatch well—and nurse well—and their flesh is very delicious. Have a well sheltered place for them to roost in, with a sufficient number of places for them to lay their eggs. Let your box be about a foot wide, and about fifteen inches high—with partitions about ten inches apart. The box to be enclosed on every side, with the exception of about six inches of the front, and at the upper part—place the box enough against the wall to prevent the depredations of children, &c. The hen is fond of a small aperture to creep into for the purpose of laying. At the proper setting season remove your eggs carefully every night into a safe place to prevent their freezing or getting much chilled, which will prevent their hatching. No "nest egg" is necessary upon this plan. The nest egg, in my opinion, seldom produces a chicken early in the spring, because of its generally having been chilled.

While the laying business is very brisk, prepare as many setting boxes as you may think fit. Let them be about eighteen inches square, enclosed on every side, with a loose cover for the top, not so tight as to shut out the air; put hay or straw enough in to form a nest, in which you may place about thirteen eggs—put the hen in the box and lay on the cover, with weight sufficient to prevent her from knocking it off. You may confine her without any injury, for three or four days, at the expiration of which time you may take off the cover, and leave her till she hatches—which, almost every body knows, will be in exactly twenty-one days from the commencement. The advantages of the large box are these: It gives room to move round without breaking the eggs, and the little ones a chance of coming out without the danger of their running away. When hens set on the ground or in unprotected places, they are subject to be interrupted by animals, and when two or three chicks are strong enough to run, they leave the nest, and the mother, following them, leaves the half-hatched to perish. This is a great loss of time, eggs, and chickens.

As the warm season advances, always endeavor to set three hens exactly at the same time—they will consequently hatch at the same time, and you can then divide the chickens of the three between two, and they can generally take care of more than they can well hatch, if properly managed.

Make as many moveable coops as you think necessary, with a shed roof and slats in front, which place in some safe place from hogs, in the sun—the sun is very invigorating to young chickens. The hen and chickens should be fed with corn meal, wet with water and milk, three times a day, and watered at least once. The hen should be kept confined in this way at least for a week, to prevent her from leading them into the wet grass in the morning, which is very prejudicial to their well being. At the expiration of that time, if the weather is good, you may place a block under one corner of the coop and let them out; at night they will return and take possession again, when you

should take away the block, and keep them in again until the dew is off the grass. If the weather is unpleasant keep them in all day.

When the chickens acquire more size and strength they should be fed in what is called a "chicken feeder," which is a covered enclosure six or eight feet square, with slats just close enough together to admit the chickens, and exclude the older fowls.

Each of my hens last year raised to perfection, on an average, at least twenty chickens. They each raised two broods, and several hatched three times.

When the chickens are taken from one hen and given to another, the one from which they are taken should be confined for about a week and then set at liberty, when she will soon commence producing another family.

From the Journal of Commerce.

ANTHRACITE COAL.

We often hear of the progress of steam, the progress of improvement, the progress of the age, &c., but the progress of *coal* in this country is scarcely less remarkable; as will be seen from the annexed schedule, derived from a more particular statement in the Philadelphia Commercial List and Price Current. The first column of tons shows the whole quantity in the Philadelphia market from year to year—the quantity remaining on hand at the close of each year being included in the stock of the year next succeeding.

Year.	Tons in market.	Sold.	Remaining.
1820	364	364	none.
1821	1,073	1,073	none.
1822	2,440		little.
1823	5,823		do.
1824	9,541		do.
1825	35,536	35,536	none.
1826	47,545	42,546	5,000
1827	68,365	60,365	8,000
1828	90,302	72,302	12,000
1829	125,815	107,815	18,000
1830	192,934	192,934	40,000
1831	214,971	214,971	none.
1832	364,051	294,051	70,000
1833	560,000	425,000	135,000
1834	514,936	394,939	120,000
1835	680,750	677,435	none.

From the Silk Culturist.

ACCLIMATION OF THE CHINESE MULBERRY.

The Secretary of the Horticultural Society of Antwerp, M. Emilien de Wael, now on a tour of the United States for scientific purposes connected with entomology, &e., has communicated to the President of the Massachusetts Horticultural Society the method of acclimating the Chinese Mulberry, as practiced in Belgium, and which we think would be attended with like success in this country. We copy the whole letter as presented to the society, and published in the New England Farmer.

"Since I have been in this country I have heard of several complaints, chiefly from the Hartford mulberry tree planters, of the difficulty experienced the last two years in making the *Morus Multicaulis* stand your winters. This kind of mulberry is easily acclimated if a proper mode of culture be adopted in places where it is planted. In Belgium, the winters, notwithstanding they are not so severe as yours, often give us great trouble, and the influence of the cold was was repeatedly experienced on these mulberries, which were often killed down to the roots.

"The late *J. Le Condele* of Hambeck, near Brussels, suggested the idea of having different modes of experiments adopted in distant places. And the one which proved the most efficient, was to cut down yearly, the Morus Multicaulis, in the same manner as is done with willows in a *Salictum*, that is to say, at a few inches above the soil, and to cover the remaining trunk with dead leaves; in three or four years, the roots being stout enough, they did not require any more covering. From the buds preserved on the plants, fine and hardy shoots came forth, giving larger and more lively leaves to feed the silk worms upon.

"It has been stated to me in a letter from Batavia (Island of Java,) that this mode of culture is much in use near Manilla and in parts of China not on account of the cold, but in order to keep the Morus in a shrubby state, which affords greater facility for gathering the leaves in the season when desired. There the mulberry seems to be planted in fields as Indian corn is here—in the fall of the year the plants are deprived of their branches, the number of which is continually increasing, and growing in one season from five to eight feet, which growth is fully equalled by our own. I would advise a similar experiment in this state; it might, perhaps, answer well."

From the Quarterly Journal of Agriculture.

HORTICULTURE—COMMON CABBAGE, EARLY YORK CABBAGE, LONDON NEW YORK CABRAGE, SAVOY, BROCCOLI, AND EARLY WHITE WARWICK PEA.

By Mr. Towers, Author of the Domestic Gardener's Manual, &c. C. M. H. S.

The *Brassica*, or cabbage tribe, presents us with the most important crops of the season, I mean the period included between the first of June and the two succeeding months. It is proposed to select three of the numerous species, namely, 1st, Common round-headed or hearting *cabbage*—2d, The *Savoy*—3d, *Broccoli*.

1. *The Common Culinary Cabbage, Brassica, oleracea*, Sect. 4. of Decandolle, No. 4. *elliptica*, the Early York and particularly that fine improved variety, now called London New York Cabbage. All the members of the tribe belong to one family or genus, termed *Brassica:* they are found in the natural order *Cruciferæ*, the leading characters of which are four opposite petals, ranged in the order of a cross; there are four petals or calyx-leaves, six stamens, two of which are rather shorter than the other four, and this latter circumstance gave rise to the name selected by Linænus to designate the member of his 15th class *Tetradynamia*, a compound Greek word, which indicates the power of *supremacy* of *four* out of six fertilizing organs. It may be of some importance to the farmer and cottager to be informed that, among all the plants of this class or natural order, not one perhaps is pos-

sessed of any really deleterious property. Among nearly one thousand species, as Dr. Lindley observes, "scattered over the face of the world, all are harmless, and many highly useful."

The varieties of the cabbage are numerous, but he *who possesses* the best Early York, has that which combines most of the valuable qualities of that excellent vegetable—compactness of heart, firmness, sweet flavor, and convenient size and form; it is also hardy, of very ready culture, and occupies but little space. I do not recommend it merely as a *culinary* vegetable; it might, and I think should, be made to rotate with the crops of the farm. It is not my desire now to digress, but I hope on a future occasion to adduce facts which will go far to prove that every farm throughout the kingdom would be improved, and the agriculturist proportionably benefited, by a greatly enlarged rotation. The land has powers and capabilities to double its productive return: We southerns are much indebted to our northern brethren for the lessens of wisdom which their refined system of agriculture has already taught us, but these cultivators, skilful and preserving as they have effectually proved themselves to be, may still advance; and with this conviction before me, I hope I may not be deemed presuming, if, at the earliest opportunity, I venture to attempt to fulfil the intention which I have alluded to above, and for which I am collecting the requisite documents.

The *soil* for cabbage should be a sound mellow loam, of a quality usually termed *fat*, or unctuous, wherein the *silex*, which forms its chief constituent, is in a state of extremely minute division, and united to a greater proportion of argillaceous earth *(alumine,)* than most common, gritty soils are; but the chief desideratum of an unctuous loam is the impalpable state of the silex; for I have analyzed one of the finest loams I ever saw, without being able to detect in it more than five or six per cent. of clayey substances, and scarcely a grain of chalk. But the cabbage will do well in most soils, provided it be exposed to the full influence of light and air, and be not shaded or stifled by trees, shrubs, or buildings.

Seed.—This will retain its vegetative power for three or more years, but it is always better to employ that produced in the preceding season, or if two or three year old seed be used, it should be tried in heat, sown in a flower pot: a serious loss of time may be occasioned by a failure of the seed-bed. An ounce of seed will suffice to sow forty square feet, if scattered broadcast, but less will be required if it be sown in drills, six or seven inches asunder; and this method is always advantageous, because the Dutch or thrust-hoe can, at any time, be passed easily between the rows. If cabbage be cultivated in the field, it is calculated that half a pound of seed will afford more plants than will grow on an acre; and it is stated, in recommendation of the vegetable for the purposes of the farm, that if the cabbages be cut, freed from bad leaves, and carried to the cow-yard, "they are more beneficial than hay, given in any proportion, when only combined with straw."

In the *fattening* of neat cattle, an acre of good cabbages may be nearly sufficient for three beasts of from forty to fifty stones each, which have been grazed in the pasture during the summer. A middle-sized bullock, in general, consumes about 100 lbs. in twelve hours."* "Half an acre will be nearly sufficient for 100 sheep, when the crop is good: a sheep consumes nearly 10 or 12 lbs. in twelve hours." *(Baxter's Agric.)* I have repeatedly tried cabbage in cow feeding, and on every account recommend the substitution of *York cabbages* for the coarser and more bulky varieties.

In *garden-culture*, we have to consider the object of the cultivator; if spring or early summer cabbage only be required, one sowing of a single long row or a small bed will suffice. In the southern or middle counties of England, it is usual to limit the period of sowing between the 6th and the 12th days of August; but in the north, I presume that the third or fourth week of July should be chosen. Experience has proved that seed sown early in July, will produce plants which are liable to run to seed in the following spring; while, on the contrary, the plants of late sowings rarely acquire strength sufficient to resist the rigors of the winter. *The soil for a seed-bed* ought to be lighter than that used during the future growth of the plants: it should be moved to the depth of a few inches, and made very fine: then, the line being strained tight, the first drill is to be cut by drawing the angle of a hoe in the direction of the line, with its edge resting against it. An inch or less in depth is sufficient; but, as all seeds rise better if they rest upon a true surface, and be closely embraced by the mould, it will be proper to level and compress the bottom of the little drill by patting it with the back of a wooden, round-headed rake, or by placing a long pole, like the handle of a rake, into it, so as to form a sort of groove. In this the seeds are to be scattered as regularly as possible, after which it would be as well to dust them over regularly with a powder composed of two parts (say *pounds*) of powdered quick-lime, one part of coal-soot, and one sixteenth part (one ounce) of flour of sulphur. This mixture is inimical to insects, and does not injure the young plants. The groove is next to be filled up with fine earth, which is to be made firm and even, by pressing it down with the flat of the spade. In like manner, all the other drills may be made and finished. If the weather be showery, and the ground in a moist state, but still free and open to work, nothing more need be done. It sometimes happens, however—as was the case to a very injurious extent throughout the summer of 1835—that the soil is found dry even to dustiness. In that case, as it will not answer to let the critical period pass over, the intended bed should be watered copiously for three successive nights, till it become complely moist, and a mat or two must be thrown over it during the intervening days. Seeds sown in soil thus prepared, will vegetate very rapidly; for warmth and moisture are the prime actuating agents of vegetative life, as direct *solar* light is that of maturation. Waterings,

* There must surely be some error in this statement, of an acre of cabbage being able to fatten nearly three beasts of from 40 to 50 stones each: 100 lbs. of cabbage in twelve hours, that is the average number of hours of day-light in each day, for twenty weeks from the end of October, will amount only to 6 tons 5 cwt. Now a middled-sized ox will, in that time, consume 30 tons of Swedish turnips. Do 6 tons 5 cwt. of cabbage yield as much nutriment as 30 tons of Swedish turnip? Ed.

or rather the ordinary sprinklings, so termed, will prove of no avail, if the seeds have been sown in arid soil, as was fatally proved last year. In hot sunshine, the mat ought to be used till the seeds vegetate. *The seedling plants* will be liable to the attacks of slugs and other enemies; to guard against which, they may be sprinkled with a little of the powder mentioned above; or the spaces of soil between the rows may be covered with dry saw-dust or chaff; but thick sowing is perhaps the most effectual means to secure a sufficient supply, and it is always prudent to practice it, because many seeds are inert; and it is better to displace the supernumeraries by timely thinning, than to have a paucity of plants, nine-tenths of which may perish by accidents. When the first true leaves appear, and acquire a little strength, much of the danger will be past, and the plants ought to be thinned out, so as to stand an inch asunder. Again, as they advance in growth, they ought to be reduced in number till double that space intervene between plant and plant.

Transplanting.—Some gardeners have attempted to obviate this operation; but the roots first produced are few in number, though strong, and of considerable length: the plants also acquire a tall and shanky growth; and above all, it is evident that, if cabbage plants be made to perfect their growth on the site where the seeds were sown, the allotted space must be very great, because they must be thinned out so as finally to stand one foot asunder at the least. Transplanting, therefore, should be practised, and that, too, as soon as the young plants have become three or four inches high, and begin to crowd each other. The operation effects two or three good objects. It causes the roots to produce a number of short fibres, or, as it is termed, to become "stocky:" it dwarfs the plants, and, while making them strong and compact, secures them to the soil; and it enables the grower to protect those left in the seed-bed (as some always should be) by covering of mats thrown over arches, formed of hoops or pliable rods, in the event of very severe weather.

In transplanting, let the bed or plot be a good firm loam, if possible, pretty well manured, thoroughly digged, and in a free, open situation. Select strong plants of nearly equal growth, and insert them in rows by means of a dibble or trowel, fixing each firmly in the soil, eighteen inches apart *every way*, if the variety be a free grower; but the small Yorks will do very well if the rows be that distance apart, the plants standing only twelve inches asunder in the lines or ranks. It is indispensable that the soil be brought closely to the roots; and made to press them firmly in every part; and should the weather be dry, much time will be gained by making the holes so deep as to receive the plant to the full length of the stem of each, and filling every hole brimful of soft water: then, by pressing the soil laterally and on every side with the tool, the roots will become puddled in, and secured at once. The period for the work must depend upon the growth in the seed-bed; and if the season be early, and the weather warm and showery, the transplanted cabbages may grow so rapidly as to require the check of a second removal, or at least to be raised up and re-set; but in general, and under ordinary circumstances, it will be sufficient to leave them undisturbed, as then the crop will be ready for culture at a more early period of the spring. In the south, it is no uncommon circumstance to cut fine-hearted cabbages in April, and very good ones in May. In the north, the growth must be more tardy in most situations.

The *seed-bed* will require care and attention. I have said that some plants ought to be left in it; and I urge the practice, because, in severe winters, the entire crop is sometimes cut off. The seedlings remaining, ought however, to be raised up; the longest roots cut back nearly one-third, and the plants be re-set in regular order and distances. Thus, supposing that 200 plants remain in it, and be made to stand four inches apart in rows which are six inches asunder, a bed little more than twelve feet long and about three feet wide, including its edges, will contain this valuable stock, which in severe weather could be covered by three or four garden mats, and thus secure a pretty ample supply of plants for the spring. Another precaution may always be resorted to. In transplanting, deep drills or grooves can be formed by the hoe or spade, and along these the plants may be set so deep, that the lowest leaves may stand just above the soil. I adopted a still more efficient plan of security last October, though I do not recommend it because I think the growth in the early spring months is thereby retarded. Having a piece of ground set up in ridges, nine inches high, and the time pressing, I planted my young cabbages in the bottom of the trenches between the ridges. On three occasions the thermometer fell twenty-two degrees below the freezing point, and not a plant has been touched, though no covering was applied at any period of the winter. My broccoli, also, has stood in perfect security, in consequence of the stems being lower than the level of the edges of trenches made expressly for them. However, as cabbages ought to be hoed freely in the autumn, and the spaces between the rows digged once or twice, as soon as the plants resume growth in the early spring, it is evident that the ridges present an obstacle to these important operations. If the winter prove mild, the cabbages will progress in some degree; but if by cold they be rendered torpid, they will start into growth with the early return of solar influence: a few may fly up to seed, but the greater part will form hearts, and can be cut in succession. In cutting, it will be prudent never to take off the green and healthy leaves, those that are inert and yellow, will scale off of themselves, or with the slightest effort: but the green and firm ones have still an important office to perfom, in perfecting the auxiliary buds which produce young sprouts. These secondary cabbages, or "greens," affect an open growth, and in themselves furnish a delicious vegetable; but they may—that is a portion of the best formed among them—be devoted to another purpose of considerable utility in garden economy. The shoots when about five or six inches long, are to be gently twisted off from the stem, and the lacerated heel of each being trimmed perfectly even and smooth with a very sharp knife, but not shortened; the young plant thus rendered a cutting is to be very carefully planted in lightish, sandy, fresh moved loam, so deeply as nearly, but not quite, to include the entire stem. The setting-stick or dibble is to be thrust diagonally into the ground in three or four places, in the direction of the heel, so as to fix it firmly in the soil, and then

a little water should be given to each plant to wash the earth closely about the stem. Detached shoots so treated, will frequently produce roots speedily, and bring a supply of excellent secondary cabbages, true to the original varieties: *seeds* are apt to sprout, owing to cross impregnations.

To sum up the chief points of cabbage-culture for spring and summer main crops, it must be observed that the *period of sowing* should be strictly attended to: the *seed-beds* are to be slightly hoed to keep the ranks clear of weeds; the stronger plants are to be timely removed to the final beds, wherein two autumnal hoeings and a moderate earthing up must be given during the progress of growth. On the approach of spring, the intermediate spaces are to be digged or forked, after the removal of the inert leaves, and the operation should be repeated when the plants evince the tendency to fold up their inner leaves for hearting. By a careful attention to these needful processes, a bed of fine cabbages will, in favorable seasons, be secured. Having thus dwelt so minutely upon the routine culture of the cabbage for the main spring and summer supply, I shall only allude to that part of the treatment of succession crops, which refers to the summer and autumnal months.

It is usual to give directions for sowing the seed at several distant periods; but my object is to obviate trouble, and to simplify operations as much as possible; and as I have proved that, by attentive management, a regular supply of fine palnts may be obtained from one extra sowing, I shall presume that an extensive seed-bed or plot exists, having been prepared late in March or early in April. The mode of culture will be understood by the directions already given: what, therefore, remains to be said, will apply to the order of routine which ought to be observed subsequent to the *first of June.* At that time, we may suppose that the greater part of the cabbages have been cut, the stems remaining being left for the production of sprouts. The seedlings of the April bed that are in a state to be transplanted, should be carefully selected, and set in a bed of rich soil, watered, and attended to in every respect as were those of the spring crop. This first bed, with the cuttings of the sprouts and the other shoots yielded by the old stems, will produce an ample supply of a second crop during July and August.

After the removal of the seedling plants, those which remain in the seed-bed should be greatly lifted and replaced, but at regular distances three or four inches apart; the ground should be moved, cleared of weeds, made level, and well watered if the soil be in a dry state. Should the plants be very numerous, a hundred or two of the best might with great advantage, be moved to a succession bed to stand in rows, six inches apart, plant from plant. Thus they will acquire stocky roots, and be checked for a time; while the seedlings will gain strength from the additional space afforded them. If a bed be formed and planted for cabbaging in June, and thence every two months; and especially if—as I must presume—a previous transplantation had already been made during May, it is obvious that a succession of crops will be secured during every favorable season till the end of October; and I may add, from positive experience, that if the weather be then fine, and the succeeding winter prove open and mild ("a green yule,") any remaining stock in the seed-bed, however long-shanked and ungainly they may be, if set deep in the soil of a well prepared bed, may make good progress to the end of November, survive the winter, and produce excellently hearted and sweet-tasted cabbages in April. Small they will be, and some perhaps will fly to seed; but those which do succeed, will amply reward the attentive care of the grower. My experience applies, of course, to the latitude of London, though in a county far westward, and much later in its productions; but I presume that in the north also these hints may be rendered to a certain extent available.

2. *The Savoy, Brssica Oleracea Bullata* of De Candolle—a variety distinguished from all other hearting cabbages by the puckerings of its leaves. It is one of the prime winter vegetables, and well merits the attention of every one who has a garden or kail-yard. There are three subvarieties—the large yellow, the green, and the smaller *green*, which is the hardiest of the three.

The savoy must be sown pretty early in the spring, and therefore I say nothing now of the early processes of its culture; but as it will require transplanting to plots where it is finally to remain, it will be needful to observe, that, as in all respects the intermediate culture will, as nearly as possible resemble that of spring sown cabbage, the directions above given will apply to it. In England it is customary to transplant at two or three periods of July for the winter supply; but it will be proper to commence the work earlier in the north, and to finish by the middle of that month. The ground should be well digged and pulverized; the texture rather light, and the quality rich. Draw drills or shallow trenches about thirty inches apart; tread along the drills or press them with a broad pole, till the soil become smooth and compact; then plant the savoys eighteen inches asunder, filling the holes with water, and fixing the roots firmly in the soil. After they have become established, and begin to grow, the spaces will require the hoeings and diggings which are so essential to the progress of plants of all the cabbage family, and have been before alluded to. As winter approaches, the earth aught to be brought up to and about the stems.

The planting in open, manured trenches, in *dry* weather will not only secure the growth of the plants, but greatly tend to protect them from frosts during winter. *Savoys* are not considered to be in perfection, till they have been exposed to a degree of frost; and they will subsequently furnish the table throughout the winter months.

3. *Broccoli.*—This variety of the cabbage tribe is divided into a number of subvarieties, all of which are excellent furniture for the garden. By Professor De Candolle it is placed in the sixth division of his arrangement, *Botrytis (Brassica botrytis) i. e.* resembling a bunch or cluster of grapes, but this grape-like species of variety admits of another sub-variety, as No. 1 is the cauliflower, *Cauliflora*, or flowering cabbage; But No. 2 is the broccoli, and is designated as *Asparagoides*, or asparagus-like cabbage. Though the similitude of broccoli to asparagus may appear somewhat fanciful; yet as precision of classification is obtained, it will be perceived that it is far better to enter into minutiæ closely, than to presist in a mode of arrangement which is equally ill-defined and undiscriminating.

This delicious vegetable is perhaps without its rival in the garden, and its culture is very simple; it is too late, however, in the season to raise it from seed, and therefore I defer to enter upon a regular detail till the spring of next year. I have, however, raised some of the finest *Portsmouth* cream-colored, from seeds sown after the 10th of June, which produced compact and exceedingly large heads in the following April or May: it may therefore be worth while to try a small sowing as early as possible in June, following the directions, in as far as concerns, the mode of preparing the soil, &c., which are given under the article cabbage, and transplanting into manured trenches, six inches deep, and ten or twelve inches wide, not later, if possible, than the third week of August. In the event of frosts, before November, no time should be lost to bring the earth that was thrown out and lay as a ridge on each side of those trenches, to the stems of the plants, as is done in earthing celery.

But if we may trust some modern writers of new discoveries, *broccoli may* be propagated by slips, with the most successful results. Every one ought to try the method who has in his garden the stems of plants, the heads of which having been cut show a tendency to protrude sprouts. In *the middle of June*, says a writer, whose article is now before me, (or for Scotland, says *as early as possible in June.*) "I slipped off a quantity of the side shoots, and planted them. I had them well watered, and well secured in the soil. They struck root in a very short time, and made strong plants which produced heads of a fine size at the usual season." "I am persuaded the plan is well deserving attention, not only with broccoli of the same kind I have cultivated *(late flowering purple)* but with many other kinds; thus an excellent variety might be perpetuated without the risk consequent upon seed."

I have not myself had an opportunity of experimenting upon this vegetable, since I saw the article quoted from, but have reason to believe the plan has been proved to be feasible; in fact, there is nothing in the analogy of the species with its type, which is unfavorable to the operation.

4. *Peas.*—At this season of the year it may appear almost too late to speak of the cultivation of the pea; but I am inclined to notice it for a reason which will be shortly explained.

The *garden-pea*, of which there are many varieties, is found in the fourth tribe, *Vicieæ* (that is among the vetches) of the great suborder *Papilionceæ* of the natural order *Leguminosæ*, and in the 17th Class, 4th Order of the Linnean System, *Diadelphia, Decandria.* Every one is aware of the peculiar shape assumed by the blossoms of plants of the pea tribe; which, it is evident, can readily be made to constitute the type of a very natural class, in which most of our esteemed leguminous or pulse-bearing vegetables are to be found.

At some future day, I intend to enter at large upon the characters of all the favorite peas for table use; but on the present occasion I only alluded to one, which is a great acqusition, and of very recent introduction, the early white *Warwick.* It is adapted to field, as well as garden culture, is moderately prolific, hardy, extremely early, rapid in its course of growth, soon off the ground; and of a high peculiar flavor, that to some persons is extremely agreeable, though others do not affect it.

The seed, two years since, was dear, its price is now reduced; and it is stated that three crops may be produced on the same land, and leave it open for wheat. This, however, I have not seen proved: but having grown the pea, I can recommend it to every one who wishes a rapid grower. A crop sown in a long drill very early in June, may be succeeded by another sown in July, with every pospects of success. If the ground be dry, from a continuance of hot weather, the best method to ensure a vigorous plant is to dig a moderately broad trench, to saturate the soil at the bottom with water, to return the earth into the trench, and make that very wet; then, after covering the earth with mats, or green boughs for a day, just to permit the earth to settle, and so far to drain itself as to become in a workable condition, to strike a drill three inches deep, to sow the seed along it pretty thickly, but not in the crowded state too frequently seen; water should then be poured from the spout of a pot over peas, and the loose earth returned upon the seeds, and pressed or troden firmly over them. One liberal preparatory watering thus given, is of more avail than fifty subsequent sprinklings. *Mildew* so common on the plant of autumnal crops, is, as Mr. Knight truly observes, obviated. He has had perfectly fine peas on his table in October, and it is certain that where disease can be prevented, peas in that season are a delicacy of the first rate excellence. The Warwick, I think, promises to prove a valuable species for the purpose of a late crop, because the course of its entire culture is more rapid than that of the "frame" or early Charlton pea. When the plants rise above the soil one inch, the earth near the roots aught to be loosened by the thrust hoe. Another hoeing must be given when the plants are three inches high; and then, after drawing the lightened earth to the stems, to the height of an inch and a half, as a ridge on each side, branching sticks a yard high are to be applied. Nothing favors pea culture more than judicious sticking; the plants are brought to the light, are supported, and at the same time protected. *Mildew* is the bane of autumnal crops: it seems to be promoted by a droughty state of soil, high solar heat during the day, and cold dews at night: rapidity of growth produced by a deep moist bed, procured by preparatory and *profuse* waterings, appears to be the only effectual security from this fungus.

From the New York Farmer.

RELATIVE VALUE OF MERINO AND SAXON SHEEP.

Cortland Village, Aug. 28, 1836.

My Dear Sir:—A "raw and gusty day"—cold enough to make a greatcoat a luxury in dog-days—drives me within doors, and for the first time since it was made, I find myself at leisure to fulfill my long neglected, but never forgotten promise.

Perhaps I can present nothing at this time, of greater interest to the readers of the Farmer generally, than the addition of a little more testimony in relation to some of those points, so warmly mooted at this day, connected with sheep breed-

ing—the several circumstances which determine the comparative profitableness of the rival breeds. Of the coarser wool and heavier carcassed English varieties, I know nothing, and therefore shall say nothing. My acquaintance has been exclusively with the Merinos and Saxons, and whatever weight my opinions may be entitled to, on other accounts, the fact that I have among my flocks about an equal number of the two breeds, or rather, the two varieties of the *same* breed, gives me the liberty of laying claim to at least, *as much* candor. as the mass of the disputants who have entered the lists in favor of one or the other of their respective favorites.

The actual difference between the Spanish and German families, of this celebrated race of sheep, I am convinced has been greatly exaggerated. When it is borne in mind that only about seventy years have elapsed, since Merinos were imported into Saxony, from the mother country, and that from these, and subsequent importations of the same stock, the whole Saxon family have descended, it must require a great stretch of credulity to believe that disparities so great and radical, so unaccounted for by any change of circumstances, could be brought to exist during this period, in the *same* breed, maintained *pure*. The only important causes which have operated to create a difference, if we except the circumstance of the Saxons being descended from picked sheep—(the original importation being a gift, to which even national importance was attached, from one monarch to another,) are change of climate, and the neglect which the parent stock suffered in the long and bloody wars of which Spain has been the theatre. It is a well established fact, that sheep changed from a moderately cold, to a warm climate, suffer a visible depreciation in the fineness of their wool, and the converse of the proposition is equally well established. This is doubtless one material reason of the superior fineness of the German Merino, and if we may trust Chancellor Livingston and Col. Humphreys,* the like effect has been perceivable in the several countries of *northern* Europe, (with the exception of England, where extraneous causes, necessary here to be examined, have operated,) into which the Merino has been introduced. In addition to the loss suffered by the flocks of Spain, in the peninsular war, by some of the choicest ones being driven into France by the French generals, and by tens of thousands being indiscriminately slaughtered for the subsistence of the conflicting soldiery and starving peasantry, it must be evident, that in such a struggle, this as well as every other branch of agriculture, would be utterly neglected. Such was the case to a most unfortunate extent, and the Spanish flocks have never recovered from the shock. On the other hand the Merinos of Saxony, with the utmost care bestowed on their breeding and general management, at the Electoral sheep farms of Lohm, Rennersdorf, Hohenstein, and more especially at the celebrated establishment at Stolphen, (near Dresden) could not, of course, fail of *improving*, unless the Germans have been deplorably deficient in even the "outside" principles of sheep husbandry.

* See preface to Chancellor Livingston's celebrated "Essay on Sheep," and Col. Humphrey's "Letter to the Agricultural Society of Massachusetts."

The popular exaggeration of the difference between the Spanish and Saxon varieties, springs, I have no doubt in a great measure from unacquaintance with *pure blooded* and *well bred* animals of one or both kinds. The man whose ideas of pure blooded Saxon sheep, for example, have been formed on those "long-legged, thin-quartered, flat-sided, narrow-boned, not sufficiently deep-chested, and long-necked" animals, which we daily hear called "pure Saxon," if a decent half bred Merino, or indeed a *decent* sheep of any breed comes under his inspection, and must of course prefer it. I will not say that none such are pure blooded, but I will say, that it is the result of defective breeding, and not characteristic of the race—and I will further say, that in nine cases out of ten, such animals have been produced by a cross between Saxon tups, (deficient themselves, because selected, as is commonly the mistake, exclusively in reference to the fineness of the wool) and native ewes, or at best, half blood Merinos. The produce of the fourth cross are paraded forth to the world, and *sold* as "*pure bloods!*" There are those who know, with myself, that the "pure Saxons" of a certain county in this state, which shall now be nameless, were thus bred—that is, one cross of Saxon with half blooded Merino ewes, of Mr. Livingston's importation. Thus one-fourth of native blood mingled in their pedigree, yet alas! their sins are all laid at the door of the "pure Saxons."

There is another class of "pure Saxons," equally notorious, and equally often quoted When the "fever" for importing this race, first broke out, and the sheep sold for such extrordinary prices, how many vessels freighted to Europe, received orders to take in cargoes, or partial cargoes of the wonderful sheep, on their homeward bound passage! Let us suppose Capt. Tarpauling acting on these instructions. He sails for the nearest port within the prescribed limits; presents his orders at the commercial house with which he has done business; and Messrs. Van Beest & Van Bruggins immediately institute the proper inquiries. Every sheep breeder within fifty leagues, it is found, has the "*pure bloods*," just as they have in this country, to the inquiry of every one desiring to purchase! The most ludicrous scene of the whole, and the next in order in the farce, presents us Capt. Tarpauling, and perchance Mynheer Van Bruggins, (who acquired their knowledge of the qualities of sheep, on the deck of a vessel, and behind the desk of a Dutch counting-house!) superintending the selection of these sires and dams of untold generations of bona fide "pure bloods." In due course of time, they are landed at New York or Boston, and sold. That they are pure blooded Saxon, "*every body knows, because they were imported direct from Saxony!*" Before me lies a letter from a celebrated German sheep breeder and wool grower, who says:—

* * "From the Royal, and other celebrated pure flocks, (in Saxony,) bucks sell from $75, to $150 per head; and ewes from $50, to $100—and at these prices, they do not give any one his choice."

Add to this the expense of importation, and let every one judge for himself, how many of the *best quality* of Saxon sheep have been brought into our country, to be hawked round at $15 or $25 a head! The remark may seem somewhat pre-

sumptuous, but I believe it nevertheless true, that as many as three-quarters of the sheep in the U. States, called, and actually believed to be *pure*, are merely the descendants of imported German grade-sheep. The native German sheep on which the cross was made, did not differ greatly from the American native. I cannot but smile on raising my eyes to a German landscape, by Berchem, which hangs before me, to notice the close resemblance between his long-legged, lank-sided, thin wooled quadrupeds, and our native sheep. The value of the produce of such a cross, might be anticipated!

There is a variety of the Merino, dark colored, and coated with 'gum'—looking much as if he had been immersed in pitchmark, and the weight of whose wool diminishes about half in cleansing, which differs widely from the Saxon; and it is from an acquaintance with this variety, probably, that many have ever estimated the difference between the two families. But between the *most approved* sheep of Spain, and the *most approved* sheep of Saxony, no greater difference exists, than has been rendered, as I have shown, indispensably by circumstances, and there is no doubt in my mind, that *these* may be almost immediately *re-assimilated*, by inverting the order of events which have wrought the change, or in other words, subjecting the Spanish Merino to the same treatment the Saxon has received, and vice versa. Further—take 100 Saxons, "as they run," out of any large flock, and take 100 Merinos, also indiscriminately, from a large flock: from the Saxons, select select 25 of the heaviest and coarsest wooled, and from the Merinos 25 of the finest and softest wooled: put with each, a buck of their own stamp, and annually exclude those, from the original number, and their produce, which evince with the least distinctness, the characteristics of their flock: how long would it be before the Saxons would be metamorphosed into a flock of "old fashioned Merinos," and the Merinos into a flock of delicate and fine wooled Saxons? But, suppose instead of thus breeding with exclusive reference to a single point, ('fineness' or 'weight of fleece,) we, as traders say, "split the difference." If we find some of our Saxons getting too delicate and thin wooled, suppose we cross them with a *good* Merino buck and on the other hand, if some of our Merino fall below the proper fineness, suppose we cross them with *a good* Saxon buck. I have a buck, which I call Rambouillet, the produce of a Merino ewe and Saxon buck, (both however the best of their kind,) whose fleece this year, weighed 6 lbs. washed, and sold in with my Saxon, at 80 cents, averaging *fairly* with the lot—making the snug little sum of $4 80, for a single fleece! Amongst my Merino ewes, I have a number whose fleeces I was at the pains to weigh, and which ranged from 4 to 5 lbs. I crossed these with pure Saxon bucks, which, although young, exceeded the average of 4 lbs. to the fleece, and I may be permitted to say, *as* fine as *most* of their blood, as in addition to having been *selected* at round prices, from the most celebrated flocks, their wool has been adjudged to staple with some of the best samples from Germany. I am exceedingly pleased with the produce. The lambs are generally wooled to their nostrils and pasterns, and are evidently finer than their dams.

The adventitious difference which has been created between the families of the Merino race, is not without its use. They both have their appropriate sphere. To the wool growers, the *perfection* of the Saxon variety, on the whole, combines the most advantages: to the farmer, who keeps but 50 or 100 sheep—who has not the conveniences for taking much care of them—who wants a quantity of medium wool for domestic consumption, and a quick sale of the remainder—the Spanish variety is the most profitable. That the "*perfection of the Saxon*" is the most profitable, "*when properly taken care of*," I may add to my own, the testimony of that enlightened gentleman, who had so often appeared as the champion of the Spanish Merino, in the agricultural papers of this state, for the last two years. The point he distinctly conceded to me, but claimed with a justice which cannot be gainsayed, that "there were very few such in the United States—not one where it is pretended there are a hundred." How can it be otherwise, when new flocks are generally started on the *cullings* of the old ones? The way to begin, (*me judice*) is exactly at the opposite extreme—with the *choicest* animals which can be purchased. One had better give $15 or $20 a head for a few, and *grow into* a flock, than give from $3 to $5 for cullings—the scum and refuse of a large flock. Such was the course which I adopted, and I believe I am reaping the benefits of it. My grown ewes averaged this year 3 lbs. per head, and the wool sold readily at 80 cents. As for *shape*, all I have to say is, that if any one who asserts, and there are those who do, that the Saxons are always deficient in this particular, will do me the honor to call on me, I will show him my sheep, and let him be his own judge. My Merinoes I thought did well, but they fell behind the Saxons about 30 cents to the fleece.

One word as to their relative ruggedness, and capacity of enduring the vicissitudes of weather, I have done. I lay it down as an axiom, that any sheep properly shaped and coated, will endure as much as it would be either humane or profitable to expose them to, were their power of endurance doubled. The quality of the wool is deteriorated, and a much greater amount of food consumed and wasted by flocks unsheltered in the winter. A sheep that is deep in the chest—broad on the breast, chine and loin—round and deep quartered, and covered with a thick fleece of wool, *with food and shelter*, will stand the winter well enough, be it Saxon, Merino, or what not. Last winter was the severest on record; yet hundreds, who called on me, will bear me testimony that my Saxons, during the intensest cold, stood up to their racks "uncurled"—fed well—and remained *fat*. I think the Merino would *endure the most abuse*, but I am well convinced that *either* will bear all they ever *ought* to be subjected to. Perhaps I may resume the subject on some future occasion.

I have the honor to be, with great respect, your obedient servant,

HENRY S. RANDALL.

ECONOMY IN LINEN WASHING.

After many experiments made by myself and others, I find that pipe-clay, dissolved among the water employed in washing, gives the dirtiest linen the appearance of having been bleached, and

cleanses them thoroughly with about half the labor, and fully a saving of one fourth the soap. The method adopted, was to dissolve a little of the pipe-clay among the warm water in a washing tub, or to rub a little of it together with the soap on the articles to be washed. The process was repeated as often as required, until the article washed was made thoroughly clean. All who tried the experiment, have agreed that the saving of soap and labor is great; and that the clothes are improved in color equally as if they were bleached. The peculiar advantage of employing this article with the soap is, that it gives the hardest water almost the softness of rain water.—

[*Dundee paper.*

Extracts from the Journal of the Franklin Institute.

LIST OF PATENTS ISSUED IN FEBRUARY, 1836, FOR IMPROVEMENTS OF MACHINES, &c. TO BE USED IN AGRICULTURE, OR DOMESTIC ECONOMY.

With remarks, by the Editor of the Journal of the Franklin Institute.

For a *Machine for peeling Apples and Peeches;* J. W. Hatcher, Bedford county, Virginia, February 3.

This, we believe, is the sixth peeling machine that has been patented, and we do not think it any improvement upon the first, which was that of Moses Coates, obtained in 1803. The one before us, has a spindle, with a fork to receive the apple, a second spindle with an endless screw, a cog wheel, pinion, whirl and band, and other appendages for moving the knife, the apparatus for moving the knife is the only part claimed.

For a *Cooking Stove;* J. R. Cochran, Francestown, Hillsborough county, New Hampshire, February 3.

There is nothing in this stove worthy of special notice, its virtues depending upon the particular arrangement of the passages for heated air, and the dampers or valves. The claims are to "the form and construction of the apertures for the passage of the fire, and the dampers for closing either of them, or the passage under the oven, and the division of the passages for fire, by partitions, whereby the whole volume of fire is thrown on one side of the stove, and a greater heat thus produced on that side, and various degrees are produced in different parts of the stove at the same time, suitable for the different processes of cooking, and with less fuel than in any other stove of equal dimensions." As one object professed to be attained in a new cooking stove is, in nearly every case, to save fuel, we shall, by the time we have another five hundred stoves patented, not only save the whole, but have some to spare, should each of them save a little upwards of one five hundredth part only.

For a *Cooking Stove;* Daniel Williams, Scaghticoke, Rensselear county, New York, February 3.

This stove resembles, in form, a number of other cast-iron cooking stoves, having a body nearly rectangular, a fire place furnished with folding doors, an oven similarly furnished above it, and openings towards the back of the top plate, for cooking utensils. Its claim to novelty consists in making the fire place a sliding drawer, which can be brought forward upon the bottom plate; this drawer has a grate upon which the fuel is sustained, and a top plate, perforated for cooking utensils. When pushed in, there is, necessarily, a double plate between the fire and the interior of the oven.

The claims are to the movable, sliding fire place, the manner of connecting it with the other parts of the stove, and particularly to the obtaining by its means, a double bottom to the oven, and thereby regulating the intensity of the heat; the provisions for carrying off the steam, &c.

For an improvement in the *Cultivator;* James M. Garnett, Loretto, Essex county, Virginia, February 3.

This is called an improvement on the X, or Echelon Cultivator. "It consists of a curved cast-iron, marked No. 3, having in the under side two dovetail grooves, which the wrought iron marked No. 4, [shown in the drawing] is made to fit, so that when one point is worne out the other may be turned. Four of these are fixed in a bar of wood diagonally, at an angle of 45°, to a straight beam of the length and size of a common plough beam for a single horse."

For a *Machine for Shelling Corn;* Isaac A. Hedges, Elmira, Tioga county, New York, February 3.

This machine in its general principles, resembles the first shelling machine which was patented. It has a revolving cylinder and a concave, between which the ears of corn are to be shelled. The cylinder is to be formed of cast-iron staves, with spaces between them for the escape of the grains of corn; the concave is borne up by springs. The ears are to be put into a hopper above the cylinder, and to be conducted through a proper aperture to the shelling part. The claim is to "the concave cylindrical surface by a combination of staves, with springs attached as herein described; and the application of such surface so formed to the purposes of corn shelling; as also the application of such surface to a cylinder for the same purpose."

For an *Oven to be used over the common Fire Place;* Samuel Pollard, Orono, Penobscot county, Maine, February 3.

This patent is taken for an improvement upon the oven patented by the same person in June, 1835, and noticed at page 46, vol. XVII. The sheet-iron oven is placed, as before, across the chimney, above its throat, and in addition to the flue leading to it, about level with the surface of the fire, there is a second flue near the throat of the chimney, which is closed by a door. A grate is fixed in the flue to sustain fuel, that a fire may be lighted there when there is none in the fire place. The claim is to "the introduction of the second described flue, damper and grate; the outside cylinder and the damper above, or on the top of it, these being the additions now made, as improvements." The second cylinder forms the flue around the oven, and is like that in common use in similar ovens set in jambs.

For an improvement in *Saw Mills;* George W. Black, Montgomery county, Tennessee, February 3.

The object in constructing this mill is to apply the power above the surface of the ground. The main cog wheel, driven by any suitable power, gears into a pinion on a pitman shaft above the sills, the pitman extending thence to a rocking shaft which gives motion to a saw frame, hung in the usual way. The claim is to the horizontal pitman and its apurtenances, including "the entire mode of driving the saw, or saws, and the mode of applying the power to them," in which the patentee perceives numerous advantages, which we apprehend will not be realized in many situations, and no where, assuredly, where water power is employed.

For a *Straw Cutter;* Isaac S. Wright, Elbridge, Onondaga county, New York, February 3. (See specification.)

For a *Machine for Harvesting, Thrashing, and Cleaning Grain;* Eliakim Briggs and George W. Carpenter, Covington, Franklin county, New York, February 5.

This machine is to run on four wheels, like wagon wheels, the adhesion of the hind wheels to the ground carrying revolving scythes, a cylinder thrashing machine, and other apurtenances. The apparatus is not fully described, and we are very apprehensive that it had not been fairly tried before being patented, as we are of opinion that its promise upon paper would not be realized in the wheat field. Its power, to cut, convey, thrash, and clean grain, and the satisfactory concurrent action of all its parts, would not, we think, have given it a passport to the Patent Office.

The claim is to "the manner and principles of applying the power of a team to cutting, thrashing, and cleaning grain, by moving forward the machine; of cutting grain, of carrying it to the thrasher, of thrashing, and of cleaning grain, by power so applied." This claim does not, with sufficient distinctness, state the particular machinery for effecting the object, refers to no individual part of it, but appears to relate more to the end than to the means, whilst the latter is the only thing patentable.

For a *Horse Rake for Hay and Grain;* Joseph W. Webb, Mount Morris, Livingston county, New York, February 5.

Behind an axeltree with two wheels, there is a frame which sustains the rake-frame, and the latter slides up and down between cheeks, furnished with grooves for that purpose; upon the bottom edge of the rake-frame are teeth, curved forward and reaching to the ground; a man stationed on a platform above the axel tree, raises the rake-frame by means of a lever, when it has collected the desired quantity, and thus deposites it. The points of the rake teeth curve back suddenly to prevent their catching in the ground. The claim is to "the manner of raising or depressing the rake at pleasure, by means of the perpendicular grooves and the lever; and the manner of curving the teeth backwards, for the purpose set forth."

For a *Machine for cleaning smut from Buckwheat ond Rice;* Samuel Richardson, Elmira, Tioga county, New York, February 5.

It is very well that the patentee sets forth no exclusive claim to this machine, as, were he to do so, he would encounter a host of competitors. The whole consists of a hollow cast-iron cone, in which runs a conical nut, both properly grooved, in the well known old coffee mill fashion.

For a *Press for Cotton, Tobacco, &c.;* Azel M. McLean, Russelville, Logan county, Kentucky, February 5.

This press consists of a lever working on a fulcrum between two upright posts, the articles to be pressed being placed under the lever, and resting on sills, or a platform on the ground. A rack and pinion below the long end of the lever serves to raise or lower it; and the improvement claimed consists in extending the lever beyond the uprights, so that it shall have a short arm projecting out far enough to press the articles by the elevation of the long arm, as they are pressed on the opposite side by its depression.

For a *Horse Power;* Dudley Marvin, Canandaigua, Ontario county, New York, February 5.

This machine is, in its general construction, like many which have preceded it, consisting of an endless chain floor upon which the animal walks, which floor is sustained by friction rollers running upon ways, and connected so as to form endless chains; it is the peculiar manner in which these are put together, upon which the patentee must depend to sustain a claim, and he says, "I confine my claim to the particular manner in which I construct the power chain, and the friction chain, as described, together with their combination with those accessory parts which are necessary to their action. I do not claim either of the individual parts as separate and uncombined."

For a *Churn;* Hezekiah Roberts, Seneca Falls, Seneca county, New York, February 5.

A vertical churn is to have the dasher made to revolve alternately in reversed directions, by means of a double strap, the two ends of which are wound round the shaft, and are alternately acted upon. To produce this motion, the patentee employs a wheel and pinion, on the shaft of the latter of which there is a crank and fly wheel. A pitman from the crank is made to vibrate a wheel which communicates the alternating revolution by means of the straps. The claim is to "the crank, connecting rod, spur wheel, pinion, and balance wheel." All of which are well known affairs.

For an improvement in the *Process of preparing bark and obtaining the extract therefrom;* Daniel Williams, Boston, Massachusetts, February 5.

We are informed that the bark is to be first divested of its outer part, after which the inner bark is to be cut into small pieces, and the tanning principle extracted therefrom by boiling, or by steam; the water is then evaporated and the extract fit for use. The thing claimed is the extracting tannin from the inner bark cut into pieces, instead of grinding or pulverizing it, by which means, it is said, the extract is more pure, being free from the admixture of the minute particles

which remain in it when procured from the ground material.

How many thousand times the chemist has thus obtained the extract of bark in his laboratory, we cannot tell, but certainly more frequently than from the pulverized material.

For an improvement in the *Cotton Saw Gin;* William and James M'Creight, Winnsborough, Fairfield district, South Carolina, February 5.

The gin retains its usual form, but the patentees claim, "first, a movable breast; second, sliding ribs, and third, the centres of the brush, and the pivots on which they turn," which improvements, they say, render the apparatus more durable, and more easily kept in order.

"The breast is hung to the front of the gin with two hinges, and can always be raised so as to get at the saws," when they require any attention. The sliding ribs are so called, because they are made so as to shift, or slide, and expose new portions of them to the action of the seed, so that they may be shifted endwise four or five times, before they require to be renewed; they are confined at their ends by screwed cleats, which are loosened when the ribs are to be shifted. The pivots of the brush are made of square cast-steel, pointed at each end, and fixed in a manner which allows of their being shifted readily when one end is worn.

For a *Bee Hive;* James W. Hubbard, Canterbury, Merrimac county, New Hampshire, February 5.

There is not any thing in the contrivance of this hive which appears to merit particular notice, the thing claimed is a mere trifling matter of arrangement.

For a *Thrashing Machine;* Lewis H. Maus, Danville, Columbia county, Pennsylvania, February 5.

This is said to be an improvement on James Parson's thrashing machine. The cylinder and concave are to be of cast-iron, and the improvement appears to consist in the casting it in parts more light and convenient than the original machine; there, however, is no specific claim, nor is there any thing in the operation of the machine, as now patented, to distinguish it from other cylinder and concave thrashing machines.

For a machine for *Planing and Dressing Boards;* Melzer Twells, Milo, Yates county, New York, February 10.

A fare wheel is to revolve vertically, carrying four, or any other number of, plane irons, and close to the periphery are to be cutting bits, or hooks, to precede the double or single irons in their operation. The boards are to be held edgewise, resting against standards upon a suitable carriage, and held against the vertical standards by dogs. The plane wheel is to be driven by one band and whirl, and the carriage to be moved by another. This comprises all the information given, and there is not any claim. The plan has nothing in it having the remotest alliance to novelty, nor does it bear those features of maturity which would lead to the conclusion that it had been tried. The fact, is that as presented in the specification, it will not work well, and if it would, a patent could not be sustained for it.

For a *Machine for Shelling Corn;* Henry G. Neale, Poultney, Rutland county, Vermont, February 10.

A rubbing board, furnished with teeth, or cased with a toothed cast-iron plate, is made to slide horizontally in grooves, by means of a handle, a second rubbing being placed under it, and borne up towards it by steel or wooden springs attached to the frame. The claim is to the whole machine as constructed.

For a *Machine for cutting Straw, Hay, &c. &c.;* Chauncy D. Skinner and Danna Reed, Haddam, Middlesex county, Connecticut, February 10.

The specification of this patent gives a verbose description of the dimensions of the different parts of the machine, and ends by claiming "the combination of the various parts as described." The material to be cut is placed in a trough in the usual way, and the knife is fixed upon the face of a wheel revolving vertically; the shaft of this wheel has a crank on it, and is to be driven by the aid of a treadle, in the manner of a foot lathe. There is no feeding apparatus, or any thing of moment not pointed out by us.

For a *Churn;* Lyman Whittier, Vienna Kennebec county, Maine, February 10.

A churn, in the ordinary form of the vertical kind, is so hung as to swing backwards and forwards like a pendulum, there being a suitable frame to sustain it. A vertical shaft passes through the top, and runs in a pivot at the bottom of the churn; wings, or dashers, being attached to it to agitate the cream. A small cog wheel, or pinion, surrounds the vertical shaft, above the lid of the churn, and the teeth of this wheel take into teeth on a piece of timber, forming a rack, and attached to the frame, which, when the churn is swung, causes the shaft to revolve; the swinging may be effected by means of a rod, or other contrivance, attached to it for that purpose. The claim is to the mode of producing motion by the action of the cogs.

For a *Machine for Cutting Straw;* Joseph Evered, an alien, who has resided two years in the United States, February 10.

The description of this machine refers to the drawing throughout, and ends with a claim to "the finger wheels; the rising and falling of the rollers; the compression produced by the lever and weight; the concavity of the knives edges; the plan of the face of the wheel through which the straw is drawn; the centre screw on the worm and spindle, and its rise." The general form of the machine such as has been in use for more than half a century, the straw being contained in a trough, furnished with fluted feeding rollers, and the cutting effected by curved knives on the arms of a fly wheel, revolving at one end of the box; these curved knives, it will be seen, are claimed as new; if the inventor could go back as far as we can in the recollection of the use of curved knives, in a manner precisely the same with their employment in this machine, he would not place *himself* among the novelties of the day. There are other things claimed, which are in the same predicament, and where so many individual things are particularized, it is not easy to avoid

such an error, as a few persons are fully informed of what has previously been done in those cases where machines have been long employed, as in cutting straw.

For a *Thrashing Machine;* Thomas Beede, Sandwich, Stafford county, New Hampshire, February 10.

This is a cylinder and concave machine, with some peculiarities about it upon which to found a claim, but not substantially different from numerous others of the same general construction.

For a *Cooking Stove;* John J. Giraud, Baltimore, Maryland, February 5.

The main improvement spoken of in the specification of this stove, is a *box door*, which is to answer the purpose of the ordinary *Dutch oven*, but what are the peculiarities of its construction we cannot discover, as it is mentioned in the specification in the most general way. There is a drawing, with letters on the respective parts, but we find no references to them, and most of the things represented have no novelty whatever. The claim is to "the door oven at the front of the fire place, as well as the general combination and structure of the entire instrument." The *door oven*, which is specially claimed, is to be dispensed with when the stove is used for warming only.

For a *Churn;* John E. Thomas, Winchester, Preble county, Ohio, February 12.

The body of the churn is to be a box, or case, through which two shafts are to run, furnished with slats, or dashers, passing between each other; on the outer end of each shaft there is to be a pinion, which is to be turned by a cog wheel; numerous examples of this churn exist in the patent office, and probably elsewhere.

For a *Horse Power;* Joseph Austin, Franklin county, Vermont, February 12.

No claim is made by the patentee to the construction of this horse power, and although such an omission is sometimes to be regretted, it, in the present instance, will not be productive of the slightest loss or inconvenience, a claim having been made thereto more than forty-one years ago, and a drawing and description of it having been given in the second volume of the Repertory of Arts, published in 1795. The plan is to obtain power by placing the animal near the top of a large, revolving drum.

For a *Washing Machine;* Luther Davison, Norwich, New London county, Connecticut, February 12.

A cylinder, the ends of which may be of wood, and the barrel part of zinc, is to revolve horizontally; round bars of wood are to reach from head to head, on its inside, standing at a small distance from its periphery, and allowing a space between each of them. A partition is also to extend across the middle of the cylinder, formed of similar bars, and dividing it into two equal parts. A door on the side of the cylinder allows the clothes to be put into either division of it.

"What I claim, is the arrangement of the bars in said cylinder, the partition of the cylinder, and the principle of washing the clothes in two separate parts of the same." A *principle*, the discovery of which will scarcely confer immortality.

For *Apparatus for Drying Cotton after it has been picked, &c.;* John Philbrick, Wilkinson county, Mississippi, February 12. (See Specification.)

For a *Machine for Shelling Corn;* Ira Smith, Downingtown, Chester county, Pennsylvania, February 13.

This machine does its work by means of a vertical revolving plate, constructed in the well known way of making such plates. The supposed novelty will appear from the claim, which is to "putting teeth or projections on both sides of the wheel, instead of on one side, as in the common method, thereby shelling twice as fast." It so happens, however, that this contrivance is old, having been patented some years since, and subsequently re-invented more than once.

For an improvement in the *Wheat Fan;* David Flanders and Calender Rathburn, Fort Covington, Franklin county, New York, February 13.

The general construction of this wheat fan is the same as those in common use, and although much pains have been taken to describe its individual parts, we are not told, and are unable to discover, in what its special utility and novelty consist.

For a *Machine for Cutting Sausage Meat;* Ambrose Henkel, Shenandoah county, Virginia, February 13.

The general construction of this machine may be inferred from the claim to "a cylinder with knives; secondly, their cutting between bars of any kind; and thirdly, the general construction of the machine." This claim is much too broad, the two first items in it not being sustained by their novelty, and not, therefore, sustaining the third.

From the Journal of the Franklin Institute.

EXTRACT FROM A REVIEW OF PROFESSOR DUCATELS' LAST REPORT OF THE GEOLOGICAL SURVEY OF MARYLAND.

[In the following article is presented an abridgment of the latter part of the Report. So much of the previous part as is connected with agriculture, was republished entire in the 5th No. of this volume.]

The report appears fully to establish the existence of green sand of the age of the New Jersey marl, in Kent and Cecil counties, and intimates that some of the members of the same formation have been discovered in the Potomac counties.

In the belief that the legislature which ordered the survey designed it as the means for developing all the advantages and riches of the state, for the benefit of every portion of the population, the geologist in prosecuting his labors, has endeavored to embrace in his report every prominent consideration of practical utility immediately or remotely applicable to the various interests of his fellow citizens.

In accordance with this understanding of his duties, he has labored, and it would seem success-

fully, in demonstrating to the agriculturists of Maryland, that they have within their reach the means of fertilizing and improving their soil to any desirable extent. Shell marl, green sand, oyster shell lime, are all readily attainable in their respective localities, whilst the unusual facilities of transportation afforded by the Chesapeake Bay and its numerous tributaries and inlets, afford to the farmers of both its shores, advantages, which are seldom equalled, and probably no where surpassed.

The cultivators of the soil are, it is said, already beginning to avail themselves of what has been pointed out in the former reports, and, if so, their practical experience will soon corroborate the scientific intelligence, which pointed out to them the sources of abundance and wealth so directly at their command.

One whole chapter of the report is occupied with considerations upon the agricultural resources of the lower counties, which is too voluminous for insertion in your pages; I therefore extract the following very interesting summary of them, intended by the author to direct the attention of his fellow citizens to the greater advantages which present themselves in their own fair territory, than may be found in the "far west" whither the restless spirit of emigration is fast hurrying a great amount of the population.

"Such are the agricultural resources of the lower counties on the Eastern Shore of Maryland, so far as the productiveness of the soil, and its susceptibility of improvement are concerned. It has already been stated, that the only incidental resource possessed by this section of country, is to be derived from the facilities of obtaining calcareous matter (in which the soil is essentially deficient) from the shell banks, oyster banks, and other sources already referred to. But before any hope can be indulged, that the inhabitants of this portion of the state will avail themselves of these means of bringing their lands into a higher state of cultivation than they seem to have any idea that they are capable of, it is necessary to remove a fatal impression, too generally made, that the lime derived from shells is of but little value. The result of the inquiries made to disprove this opinion, will be given in the next section of this report.

"An error equally fatal prevails among the citizens of Maryland, in reference to the counties that have just been passed in review—that they are as devoid of interest as they have been believed to be of resources. It is hoped that the minute, and, at the same time, faithful account given of them—more minute than would otherwise have seemed necessary—will have a tendency to rectify the false judgment so commonly passed upon this portion of our territory, and contribute likewise to cheer those of its inhabitants who have become disheartened at the present aspect of things, and who are too prone to believe that their industry could be better rewarded at a distance."

The immense heaps of oyster shells furnishing vast supplies of lime, has induced Prof. Ducatel to devote an entire chapter, to a comparison of the value of shell and stone lime—an opinion prevalent among Maryland farmers that the former was inferior, for agricultural purposes, to the latter, is satisfactorily refuted. The analysis of the respective kinds of lime, showed a decided advantage in the employment of *equal weights* of lime obtained from calcined shells, over that obtained from limestone.

The annexed extract furnishes a general summary of the comparison; it is preceded by a particular account of the analyses of ten specimens of limesone, from Baltimore, Harford, and Frederick counties.

"It will be perceived that three out of ten are magnesian limestones; all of them contain more silica or sand than has been found in oyster shells, and one, said to most extensively used in Harford county, contains as much as 11 per cent. of inert matter. It follows, therefore, that, as oyster shells are composed nearly of pure carbonate of lime, they will afford a lime containing scarcely an appreciable quantity of impurities. If well burnt, (which is the case when no effervescence is observed on treating them with a weak acid,) lime obtained from them may be deemed, with a fractional difference, equal, weight for weight, to the best stone lime; and as their chemical composition does not vary, there is nothing to be deducted from the value of the product in consequence of the impurities that exist, as exhibited by the foregoing table, in most limestones, and that must necessarily form a part of the residue when *these* are burnt.

If the comparative value of the two products be estimated by measure, a greater difference is discovered; but there is at the same time a disproportionate difference in price. A bushel of the best alum-lime weighs from ninety to a hundred pounds; whereas, the same bulk of shell lime, unground, weighs from sixty-five to seventy-five pounds, and perhaps when ground would weigh eighty pounds—a difference of from twenty to twenty-five per cent. But the former costs from thirty to thirty-five cents at Baltimore, the most convenient spot for its delivery on tide-water, where the latter can be had for ten cents; whilst farmers, conveniently situated on the bay side, might themselves burn the shells at an expense not exceeding six cents a bushel. These remarks refer to the lime obtained from recent or fresh oyster shells; but there is little or no difference between it and that procured by the burning of those contained in the Indian shell banks, provided proper care be taken to separate them from the black mould and dirt with which they are mixed.

It has been supposed, that because alum-lime has been found to admit of a greater mixture of sand than shell lime, in the making of mortar, it was to be inferred that it is correspondingly better, or, as it is termed, *stronger* for agricultural purposes. But this is an unwarrantable conclusion; for, as this circumstance seems to depend upon the peculiar aggregation among the particles of the lime, which prevents it from *setting* too rapidly, (or, in other words attracting water and carbonic acid from the atmosphere sooner than the wants of the mason require,) it would appear, on the contrary, that, if any inference is to be drawn from it, it is adverse to the conclusion; whilst, on the other hand, the fact that shell lime *sets very quickly* is favorable to the opinion, entertained by some persons, of its superior efficacy in agriculture—it being generally understood that lime acts in the soil in the condition of carbonate of lime. Admitting, however, that the peculiar arrangement of the

particles in stone lime which renders it in general coarser than the lime obtained from shells, may better fit it as a mechanical amendment to certain soils, the difference is at most as one to three, according to the datum upon which its superiority is predicated; namely, that in the preparation of mortar, stone lime will bear three times as much sand as shell lime. But even in this respect the conclusion is not warranted, except perhaps in the case of a purely sandy soil, in which lime *alone* would, it is believed, prove of little service."

The discovery of green sand forms an important epoch in the agricultural history of the state, on account of its value as a manure; and a considerable space is devoted to its consideration. The author combats the opinion expressed in the Farmers' Register, that the fertilizing properties of this marl, are due to the sulphate of lime which it contains, and attributes them, with much reason, to the potassa found by analysis to exist in it, adopting thus, the conclusion of Prof. H. D. Rogers, in regard to the Jersey green sand. The geologist's account of this interesting formation, as well as that of the *micaceous black sand* associated with it, will well reward a careful perusal.

The greater portion of the report is occupied with an examination of the three lower counties of the Eastern Shore of Maryland, but there is a chapter containing a "Geological Examination of St. Mary's county, in reference to its agricultural resources"—and a number of localities of shell marl or fossiliferous deposites are pointed out which may be made available. The gypseous clay mentioned in the first report, is also alluded to as doubtlessly affording a valuable agricultural resource. In addition to the marl, St. Mary's county also possesses the Indian Shell Banks, already referred to as existing in the Eastern Shore counties.

Under the title "Progress of the Geological Survey of the State" the geologist, gives a detailed account of the extent of country visited by him during his tour of duty. Twelve of the nineteen counties of the state have been visited, and six of them, it is said, thoroughly examined so far as the purposes of the survey appear to require.

It is believed that this brief sketch of the contents of the report, will suffice to justify the assertion made at the commencement of this notice, that the industry, skill, and scientific attainments of the gentlemen employed by the state of Maryland, are such as eminently quality them to execute the task which they have undertaken. And should the citizens of that state duly appreciate and employ the resources at their command, prosperity and wealth will abound in situations where the soil has been hitherto deemed as of but little value; the same rich treasures being within their reach which were so long unknown in the state of New Jersey, and which, since their value has been known, has caused the wilderness to blossom as the rose.

It appears from information which may be relied on, that the able manner in which Prof. Ducatel has discharged his duty, and the judicious construction which he has placed upon the intentions of the legislature, have already much more than repaid the expenses which have or will attend the examination. Lands have risen in valne, new products are beginning to be obtained from the soil, and instead of exhausting its fertility by continued cultivation, without the attempt at renewing it, the means pointed out have been resorted to, by which it may regain its original vigor, and even the "old fields" again become laden with harvests. From present indications, it appears almost certain that the splendid schemes of Internal Improvements, now projected by the state of Maryland, will be carried into operation at a very early day, thus affording the means of communication throughout the larger portion of her territory. The fruits of the husbandman's labor, and the mineral treasures from the mines, with which she appears to be liberally supplied, will thus find a ready market. And we may fairly hope that when the blessings which must result from such improvements are fully experienced, it will not be forgotten that a large debt of gratitude will be due to those branches of science, without whose aid the hidden treasure would never have been brought into view; and that a flourishing community will, in its turn, contribute liberally to their further advancement.

From the Farmers' Series of the Library of Useful Knowledge.

GREEN CROPS FOR MANURE.

Green manures consist in full crops of succulent plants—such as buck wheat, rape, tares, and many others—which are ploughed into the land, and have been applied in many instances with very singular advantage, more especially on calcareous, gravelly, and sandy soils, the fertility of which has been thus greatly improved. The practice dates as far back as the time of the ancient Romans, and is still continued throughout Italy, even in places where the dung of animals can be procured in abundance. The climate of that country is, however, more favorable than ours to the system, for the corn harvests are so much earlier, that they are off the ground in time for succeeding green crops to arrive at full maturity; and it is there thought that nothing tends more to the improvement of the land than ploughing them down.* It has indeed been held by many intelligent men who support an opposite opinion, that the land which produces these crops will be deprived of their vegetative properties in proportion to their luxuriancy; and, therefore, that, by returning the crop into the same land, its fertility only be increased in the same degree as it was reduced by their reduction. This theory, how-

* In Tuscany, the plant which is chiefly sown for this purpose is the white lupin, a leguminous annual plant well known in our gardens, which grows in sandy and loamy soil, to the height of two or three feet, with a stem of equal strength with the bean, and bearing somewhat similar blossoms and pods; but the produce is so bitter that it is unfit for the nourishment of either man or beast, until prepared by some manufacturing process. It arrives to a considerable size in the month of October, when it is ploughed into the soil; and very extraordinary fertilizing properties are attributed to its effects, which are ascribed to the great quantity of gluten which it is known to contain. Whether it might be brought in this country to a sufficient degree of maturity for that purpose, as a field crop, we have no means of judging; but it may be worth the experiment.—*Simonde, Tableau de l'Agriculture Toscane*, p. 72.

ever, can only be supported upon the principle that plants are fed more by the soil than by the atmosphere; whereas it has been shown, by many curious experiments, that the air and water are the chief sources of vegetation; and it is a fact, that poor land, without manure, which by the fortuitous chances of the weather has produced tolerable green crops, has been found more fertile after their production than before.

When ploughed into the land, they however often remain for several months, before they decay, for their decomposition goes on slowly beneath the soil, and they are therefore frequently more beneficial to the second than to the first crop. To turn them in effectually, they should be first heavily rolled, and then followed by a trench plough, for the operation cannot be completely performed with a common plough; and, if not entirely buried, their points stick out between the furrows, by which they are partly prevented from fermenting, and a portion of their value as manure is thereby lost.

The *time of the year* when they should be ploughed in, must, of course, depend upon the nature of the crop, which should always be buried before it arrives at perfect maturity, or otherwise it will rob the land of that nutriment with which it is intended to supply it. Most farmers take the first growth of tares and clover, which, if fed off early, is an economical plan; but if mowed, it is only doing the business by halves, for the land is thereby not only deprived of the dung of the cattle, but the operation is then too long delayed, for the work should be done in the heat of the summer, or, at the latest, early in the autumn, while the sun has the power to forward the fermentation. The effect, indeed, will greatly depend upon the season, for the process of fermentation is only slight when checked by the want of free communication with the air; and if the weather be cold, the power of the manure will be in a great measure lost; but if the season be moderately moist, and very warm, the fermentation will be much promoted, and the crop will be converted, by putrefaction, into a mass of nutritive mucilage. Nothing short, however, of an abundant crop will have that immediate effect, as a large mass decomposes much more speedily than a small one; and, if very scanty, the latter perhaps may not putrefy at all, or its decomposition will be so very gradual that the land will be very little perceptibly the better; but if such a quantity be turned under the earth as will excite the force of fermentation, there can be no doubt but that it will then be greatly as well as promptly benefited. Sir Humphry Davy, indeed, says, "that this gradual decomposition affords a supply of vegetable mould for several years;"* but although, as a chemist, he may be right, yet every practical farmer must know that, with such materials to work upon as cannot materially enrich the staple of the soil, his object should be to obtain such immediate effect as will enable him to put the land into a state for growing one good crop, which by its means of producing manure, will probably lead to others. If the question whether it be most profitable to appropriate green crops as the food of cattle, or as manure, be put aside, and that the sole object is the improvement of the land by the latter process, then there can be little doubt that the crop should be ploughed down as soon as it is in bloom, for the land will thus have its full benefit, besides the partial advantage of the bastard fallow; to which, however, there is this difficulty opposed—that the ground cannot be again ploughed until it receives the seed furrow, and therefore cannot be cleaned except by the operation of horse-hoeing, or scarifying, which, if the soil be foul, we need not say will prove ineffectual.

The *crops which are most generally applied to this purpose* are—buckwheat, winter tares, the second year of clover, and rape; which last, from its oily nature, has been found very effective. There is, however, a plant which, although but seldom sown in this country, is very commonly grown throughout Flanders, for the pasturage of cows, and is there sown, like brush-turnips, immediately after a crop of wheat, yet in a couple of months afterwards affords a large quantity of succulent food. Several trials of it have also been made with the happiest results in many parts of Germany, of its effects as a green manure; for it not only possesses the advantage of putrefying with great rapidity when ploughed in, but also that of producing a crop by being merely harrowed across the stubble, and the seed costs a mere trifle;* it is called *spurry*.† Out of a number of trials which have been recorded in this country, we select the following from the Essays of Mr. Burroughs on green crops and on manures:—

Experiments.

1. A field of strong clay, containing three acres, on Mr. B.'s own farm, was laid out in the following manner. One acre was fallowed during the summer, and prepared for wheat with sixty barrels of lime, harrowed in; the adjoining acre was sown with winter tares, which were once cut, and the second growth turned into the land when the blossom appeared; the third acre was planted with potatoes, and manured with farm-yard dung. The entire of the field was sown with wheat the first week in November, at which time the acre sown with tares was much cleaner and in better health than those planted with potato or fallowed, and the following year produced more wheat, and of better quality, than either of the former. After the wheat crop was carried off, the field was immediately ploughed, and in the following May sown with barley and grass-seeds. The average of the corn off the three acres was nearly the same; but the meadow, the following year, produced more abundantly off that part of the field where the tares had grown, and the land was much freer from weeds.‡

* Elements of Agricultural Chemistry, 4to. p. 244.

* Annales de l'Agriculture de Basse-Saxe: 3me année, sect. 1re.

† See also Lord Dundonald's Treatise on Agricultural Chemistry, regarding the cultivation of *sorrel* in poor worn-out soils, for the purpose of a green manure; in which its application to the land along with lime is strongly recommended upon grounds which are well worthy of attention, but too long for insertion here.

‡ Essay, No. I. On the Cultivation of Green Crops, p. 29.

2. After many ineffectual trials made by a very experienced farmer, in Herefordshire, to produce a crop of wheat off a field which had been several years in cultivation, he sowed winter tares as a fallow crop preparatory for wheat. The first growth of tares was mown for soiling, and the second ploughed in for manure; yet, even under this management—of soiling, instead of feeding on the land, and of ploughing in the second, instead of the first, crop of tares*—the wheat afterwards produced was superior to any corn-crop he had ever obtained off the same field.

3. On part of a ley-field, in the country of Kilkenny, the tops of a crop of turnips on an adjoining close were cut off and spread upon the sward before it was ploughed up, after which the entire field was sown with oats; but the crop on that part of the field where the turnip-tops had been ploughed in was so materially better, that it produced one-third more in proportion than the rest of the ground.†

Mr. Burroughs also says, in a communication to Sir John Sinclair, "that he has often laid down land with vetches and grass-seeds, and has not only observed that they retain their fertility much longer than when sown with oats or barley for that purpose, but that he has known grass-seeds which have failed when sown with oats, to have succeeded when sown with vetches:" from which, and other experiments, he expresses himself satisfied that "the ploughing-in of appropriate green crops is a cheap, effectual, and profitable mode of improving exhausted or light soils."‡

On this we so far agree with him, that upon arable land which, from any circumstance, is deprived of the benefit of a due application of farmyard dung, or other putrescent manure, there can be little doubt that green crops of quick growth, abundant foliage, and easy decomposition, may be turned into the land with considerable advantage; but we cannot accord in his opinion that they will be found an effectual mode of improving exhausted soils, for on such land they grow too feebly to produce much effect. The ground, to be benefited by their application, should be capable of bringing them forth, if not luxuriantly, at least with such abundance as to furnish complete shade during their growth, and sufficient vegetative matter to occasion a rapid fermentation when buried: we therefore conceive that this species of manure is more appropriate for the preservation of good soils in a state fertility, than to the improvement of those which are impoverished. This probably will in a great measure account for the comparative rarity of the practice on extensive farms containing tracts of poor land, the cultivation of which is chiefly dependent upon the fold; while, on those of a richer description, it may be fairly questioned whether the dung made from a large green crop, when fed off, or soiled, may not be equally beneficial in its effects upon the soil as if ploughed down, besides the superior profits thus gained by its support of the stock.

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*It is well known that unless tares are cut at a very early stage of their growth, there is no second crop.

† Essay, No. II. On Manures, and their Application, pp. 35 and 36.

‡ Sinclair's Code of Agriculture, 3d ed. App. p. 66.

Communicated for Publication in the Farmers' Register.

HUSSEY'S GRAIN CUTTER.

Report of the Board of Trustees of the Maryland Agricultural Society for the Eastern Shore of Maryland, on the machine for harvesting small grain invented by Mr. Obed Hussey of Cincinnati, Ohio.

The favorable accounts of the operation of this implement in several of the western states induced the Board to invite Mr. Hussey to bring it to Maryland and submit it to their inspection. It was accordingly exhibited in Oxford, Talbot Co. on the first of July in presence of the Board and a considerable number of other gentlemen. Its performance may justly be denominated perfect as it cuts every spear of grain, collects it in bunches of the proper size for sheaves, and lays it straight and even for the binders. On the 12th of July a public exhibition was made at Easton, under the direction of the Board—several hundred persons principally farmers, assembled to witness it, and expressed themselves highly satisfied with the result. At the Trappe where it was shown by the inventor on the following Saturday, an equal degree of approbation was evinced. It was afterwards used on the farm of Mr. Tench Tilghman where 180 acres of wheat, oats and barley were cut with it. Three mules of medium size worked in it constantly with as much ease as in a drag harrow. They moved with equal facility, in a walk or a trot. A concise description of this simple implement will show that it is admirably adapted to the important purpose for which it was invented. Resting on two wheels which are permanently attached to the machine and impart the motion to the whole, the main body of the machine is drawn by the horses along the outer edge of the standing grain. As the horses travel outside of the grain it is neither knocked down or tangled in the slightest degree. Behind the wheels is a platform (supported by a roller or wheel) which projects beyond the side of the machine, 5 feet into the grain. On the front of the edge projecting part of the platform is the cutter. This is composed of 21 teeth resembling large lancet blades, which are placed side by side and firmly rivetted to a rod of iron. A lateral motion is imparted to it by a crank, causing it to vibrate between two rows of iron spikes which point forward. As the machine advances the grain is cut and falls backwards on the platform, where it collects in a pile. A man is placed on the part of the platform directly behind the machine, and with a rake of peculiar construction pushes off the grain, in separate bunches, each bunch making a sheaf. It may appear to some that the grain will accumulate too rapidly for this man to perform his duty. But upon considering the difference between the space occupied by the grain when standing and when lying in a pile after it is cut, it will be evident that the raker has ample time to push off the bunches even in the thickest grain. In thin grain he has to wait until sufficient has collected to form a sheaf.

The machine [is] driven around the grain, which may be sown either on a smooth surface or on corn ridges. For the first round, a way may be cleared with a cradle; but this is deemed unnecessary; for the grain, when driven over, is left in an in

clined position, and by cutting it in the opposite direction, as much of it is saved as with a cradle. Fourteen acres in corn lands were cut between 10 A. M. and 7½ P. M. The hands had never worked with the machine before, nor was it a trial day's work. For owing to the shortness of the straw, the machine was not allowed to cut when passing over the ridges from one side of the ground to the other, and this time was consequently lost. From the principle on which the cutting is performed, a keen edge to the cutter is by no means essential. The toughest weeds, an occasional corn stalk, or a stick of the thickness of a man's little finger, have been frequently cut, without at all affecting its operation: it can be sharpened, however, in a few minutes with a file. The width of the swath may be increased by having the cutter made longer, and the same machine will cut a stubble of several different heights.

There is ample room to make the different parts of any size, though the strength of every part has been fully tested. The machine has been often choked by oyster-shells getting the into cutter, in attempting to cut too low a stubble. The motion of the machinery being checked, the main wheels slide on the ground, the strain on every part being equal to the power exerted by the horses. It can be managed by any intelligent careful negro. We deem it a simple, strong, and effective machine, and take great pleasure in awarding unanimously the meritorious inventor of it a handsome pair of silver cups.

ROBT. H. GOLDSBOROUGH,
SAMUEL STEVENS,
SAML. T. KENNARD,
ROBT. BANNING,
SAML. HAMBLETON, Sr.
NICHL. GOLDSBOROUGH,
ED. N. HAMBLETON,
JAMES L. CHAMBERLAIN,
MARTIN GOLDSBOROUGH,
HORATIO L. EDMONDSON,
TENCH TILGHMAN.

From the Genesee Farmer.

HESSIAN FLY AND WHEAT INSECTS.

Good entomologists are few in proportion to other cultivators of the sciences. When their attention is directed therefore, to such insects as interfere with our rural economy, and successfully point out to us practicable methods for counteracting such invaders of our rights, we are always thankful—though we have to regret that *to be useful* seems to have occupied less of their attention than the interests of gardening and agriculture demand.

The following extracts are from a letter which we lately received, and were written by one who has looked closely into such matters. We only add that he is a practical farmer.

"The Hessian fly and wheat insect, both belong to the same genus, called *Cecidomyia* by modern entomologists. *Tipula* I believe was the old genus from which the former was separated.

* * * * *

"The best and most interesting part of the story has not been told:—The Hessian fly is destroyed by a minute but formidable enemy, called the *Ceraphron destructor* by Say; and the wheat insect by *two* enemies that destroy it in the same manner as the Ichneumon does the caterpillar. [That is to say, they deposite their eggs in the skin, and the larvæ which hatch out from those eggs, then feed on the living caterpillar, or wheat insect, till they destroy it.]

"I see no good cause for alarm, either on account of the hessian fly or of the wheat insect, as both are are thinned by their winged enemies, sometimes nearly extirpated. If our winter had been an ordinary one, we should have had tolerable crops of wheat in despite of the fly. The more I become acquainted with the habits and manners of insects, the more I have to admire the wisdom and goodness of God as manifested in the creation."

From the New England Farmer.

SILK CULTURE.

From the correspondence of Gen. Tallmadge, it appears.

1. That one great source of the national wealth of France, is the product of the vineyard, under the culture of the husbandman—and the silk worm under the fostering care of the wife.

2. That in Italy, partially, and chiefly in France, the culture of silk is carried on by private and individual industry.

3. That a damp climate is injurious to the silk worm—and that the culture of silk does not prosper *near the ocean.*

4. That France does not produce one half of the raw silk which she manufactures. Her population is so dense that she cannot furnish sufficient space for mulberry trees.

5. That the warm dry summers of the inland parts of the United States are admirably fitted for the culture of silk in families, and that we shall succeed in it. ***That when the leaves of different kinds of mulberries are mixed together, the worms will select and gather the Chinese mulberry.***

6. That in Europe the mulberry trees are cut off and kept dwarfed, for the convenience of gathering leaves.

7. That although the Chinese mulberry is vastly superior to any other for feeding silk worms, yet from the inaptitude of French farmers to change habits, there are comparatively but few of the Chinese mulberry set out in France. At this time there are probably growing in America more Chinese mulberrics than in all Europe. Even after the experience of ages, Europeans are said to act more from usage and habit, than skill and experience. The demand for mulberry in America is so great, that the French this year have sold us 100 trees where they have set out 10 for their own use.

From the Genesee Farmer.

ACID IN WOOD—ITS EFFECTS ON SALT AND BUTTER.

It has been frequently remarked by those who are in the habit of packing butter, that that kept best put down in stone, the next best in oak or white ash firkins, the wood of which had been boiled for several hours previous to working, and that butter packed in firkins made of unprepared wood fre-

quently acquired a strong and disagreeable flavor, which seriously injured its quality. The reason of this has not been generally understood. Mr. Moir, of Scotland, has been instituting a series of experiments on the subject, which appears to have thrown some light on the matter. He found that most kinds of wood contain considerable quantities of *pyrolignic* acid, which decomposes the salt with which it comes in contact. The *Linden*, or basswood, was the only wood he found entirely free, but the other kinds he experimented upon were easily freed from the acid by boiling three or four hours, well pressed under water. It is evident that firkins made of staves prepared in this way would be decidedly improved, and as the preservation of butter in a sweet and pure state is an important matter to the dairyman, we think much would be gained by a proper attention to the vessels in which it is packed.

The fact that wood in general contains large quantities of pyrolignic acid is no new discovery, or its injurious effects upon salt unknown. At the large salt works in the Austrion Tyrol, the water as it flows from the springs is too weak to be profitably boiled. To raise it to a proper degree of strength recourse is had to evaporation. This is effected in immense buildings, very high, and filled from top to bottom with closely pressed faggots of fine brush. The water is conducted to reservoirs in the top of these buildings, and thence is distributed in such a manner as to fall through the whole mass of faggots to the bottom, where it is received into cisterns or reservoirs, from which it is conveyed in pipes to the places for boiling. In this process of percolating through the brush, it is found to gain in strength nearly one half, or rather from the immense surface of the water exposed by this method to the action of the air, the evaporation is so rapid that this effect is produced. It was found that different kinds of brush had very different effects on the quality and quantity of salt produced, and some after repeated experiments were pronounced entirely inadmissible. Those that contained the least acid were found universally the best, and at the present time little besides the fine twigs of the linden is used for replacing such faggots as at very distant intervals of time it becomes necessary to remove, the salt giving them, by its constant and thorough saturation, an almost unlimited duration.

G.

ON THE IMPROBABILITY OF THE LEGISLATURE AIDING THE IMPROVEMENT OF AGRICULTURE.

To the Editor of the Farmers' Register.

September 20th, 1836.

Mr. Editor:—Although I was much gratified, upon the whole, by the perusal of Col. Gooch's two numbers in your last Register, and agree with him entirely, that "legislative action is required," (nay, *imperiously* required,) "in aid of agriculture;" yet I differ from him altogether, in the opinions and hopes expressed at the end of his second number. To utter this dissent is my present purpose, and in a way which, I trust, will not be displeasing, either to you or himself, however hardly it may possibly be thought to bear on some others.

In speaking of the agricultural community, Col. G. remarks. "*That* community can not be expected to acquiesce much longer in delay and indifference," &c. Now, if coming events can be predicted, with the least certainty, from those which are past, an acquiescence which has lasted, and with the most exemplary patience too, ever since the government existed, may very reasonably be expected to endure for ever. Sir Robert Walpole once compared our class to sheep, who always submitted to be sheared without resistance, by any who attempted it, as often and as closely as they pleased; and if ever there was a country whose agricultnrists verified the remark, our old state, (God bless her,) is that one.

In the next sentence Col. G. adds, "But my confidence in the patriotism of the legislature, and in their disposition to do any thing for the public good, when they see clearly how it may be done, is such, that I am sure the members will, between this and the time of their meeting, reflect seriously on, and inquire into this vital subject, and be prepared to legislate wisely and efficiently upon it."

This kind of confidence is, without doubt, very comfortable to him who feels it, as well as agreeable to those in regard to whom it is uttered. I regret therefore that I cannot conour in it. Nay, even in Col. G. himself, I must believe that it is prompted rather by long deferred, unfounded, but still fondly cherished hope, than by any experience on his part—any recollection of a solitnry enactment favorable to agriculture, passed by a Virginia legislature, since our separation from Great Britain. *No such enactment* being in my recollection, and judging of the future by the past, I can feel *no such confidence*, and am consequently destitute of all hope on the subject of "legislative action in aid of agriculture."

It is true, Col. G. has guarded himself pretty well against the charge of being too sanguine or credulous in his anticipations of this aid, by limiting their fulfilment to the time "*when they*," (the legislature,) "*shall see clearly how it is to be done.*" I also shall expect them to be fulfilled, should this ardently to be desired "*when*" ever come. But as clearness of vision in regard to the great and vital interests of agriculture seems never to have been an attribute, either required or manifested in Virginia legislators, I cannot say more of it, than that I shall always be prepared to hail it as a God-send, if it ever should be exercised in our behalf. Until then, I can entertain no hope, nor even shadow of expectation, that the mental eyes of our law-makers will ever be directed towards the means of agricultural improvement and prosperity; still less, that any laws will ever be passed to promote them.

In conclusion, permit me respectfully to suggest, not only to Col. Gooch, but to all the rest of our brethren, never more to look for legislative aid to our class, until we can prevail on ourselves to choose agricultural patriots to represent us, rather than political party prize-fighters, and makers of presidents and vice presidents. Never more to ask any thing for agriculture, until political party battles and political party victories shall certainly have ceased to be deemed matters of such paramount, such very superior importance to the great agricultural and commercial interests of the country, as to render the qualifications for fighting those

battles and achieving those victories, the only pre-requisites in choosing our legislators. If we demand not good moral character, good talents well cultivated, and statesman-like qualities, as indispensable qualifications in our legislators, is it not something far worse than preposterous folly, to expect salutary laws from any body of men whatever, chosen, if not without any reference to such endowments, at least with a public and general understanding that zeal and skill in party-warfare will be deemed immeasurably more valuable, than all other qualifications put together. The natural, nay, the inevitable consequnce must be, if the people themselves *will act* upon such anti-patriotic principles, that their representatives *will deem it* both their interest and their duty to pursue a similar course. Away then—forever away with agricultural and all other interests, but those of political party, which, from their very nature, must be partial, monopolizing, and exclusive. We have no middle course between a faithful and undeviating adherence to our own interests, as inseparably connected with those of the American people, and the demoralizing, distracting, and baneful interests of political party, which, (call it by what name you please,) will always make the national interest subservient to its own, although the promotion of the former is ever made the pretext for the most unhallowed and iniquitous of its own proceedings. That we never have had any active, efficient friends to agriculture in our legislature, is, unquestionably our own fault; and so long as it remains so, we should blame none but ourselves for that deplorable neglect and consequent depression of all agricultural interests in Virginia, which is so rapidly desolating every part of her territory, that those called neighbors, will soon live too far apart even to hear each others' dogs bark. But the remedy for this shameful, most ruinous legislative neglect, is not any longer to degrade ourselves by annually begging for what we have a right to demand. No, let us never again expose ourselves to such humiliation, but endeavor, with our utmost zeal and perseverance, to devise some ways and means among ourselves, to resuscitate our fast sinking agricultural interests, and secure for them that permanent prosperity, which is indispensably connected with the national welfare as its most essential procuring cause. The next Agricultural Convention will furnish a good opportunity for the incipient steps towards the accomplishment of this most desirable object, provided it be as fully attended as it ought to be: much more fully, it is to be hoped, than the first, for that proved any thing but encouraging to the true friends of the cause. By the way, would it not be better to meet on the 2d Monday in December, than the 2d Monday in February? The weather then, will probably be better; and if any members of the Legislature should also be members of the convention, they will be on the spot to attend, whereas, before the 2d Monday in February, the Legislature ought certainly to adjourn—even if instead of taking the ten-hour prescription for official labors, they will work only five per day, in matters exclusively of legislative duty. This would be a truly gratifying spectacle to every real friend of the Ancient Dominion; but that you, or I, or any of our descendants to the third and fourth generation will ever see a Virginia Legislature thus patriotically employed—should public sentiment remain what it is in regard to the true and essential duties of legislators—is deemed an impossibility—at least by your old friend

COMMENTATOR.

[Our correspondent is mistaken as to the time for the second meeting of the Agricultural Convention. It was appointed to be held on the second Monday in January: and we take this occasion to call attention to the matter, and request all belonging to the agricultural interest to bear it in mind, and have delegates sent from the existing agricultural societies, and from public meetings where no such societies have been formed.—Ed.]

ON PATENTS FOR INVENTIONS.

To the Editor of the Farmers' Register.

* * * * *

You complain of John Bull running away with American inventions. The old fellow, as long as I can remember, has been said to improve, and to leave to others the trouble of inventing. But, is it not to be expected that this will always be the case, when in a community so small as is this, there should be such a want of community of feeling—a liberality so limited, or rather an illiberality so illimitable? And, as I am now on the subject of improvements, I will just suggest a practical illustration of what, in my opinion, would be an improvement as to new inventions of the lesser, though not less beneficial, order. The Society of Arts in London, on condition that the owner of the improvement of this class, will forego the patent, will give him a certificate of its value, and this giving it a character, is, I think, generally found to be an equivalent. If the Franklin Institute were to act thus, the patentees would be exchanged for owners of legitimate and real improvements; and in such populations, as those in which they will become popular, will receive a full equivalent, and the public would be preserved from much fraud—especially in washing machines. The deception in this hoax is enormous; and, when it is considered that J. C. Curwen, of Cumberland, as early as 1802, had all the clothes of his farm steamed without rubbing, the trick is still more remarkable. (*Vide* his Agricultural Hints.)

But, by the recent patent law, I see in the tariff of rates, John Bull is to pay $500; any other foreigner $300; and the citizen but $30. As to foreigners, they will cheerfully submit; as, if a patent is not worth $500, it is not worth a *sou:* but I cannot otherwise than believe that, as the *caveat* principle is, I apprehend, for the first time put into practice, it would be better to charge $300, $400, or even $500 *to every one*—especially, if for lesser objects, the Franklin Institute could be induced to act, and the owners to acquiesce. The fund created by the increased charge, might accrue for the benefit of distressed, although successful, inventors, (a class too often to be found,) or be disposed of in any useful manner—to the descendants of such men as Fulton or Whitney, for instance.

But, as to charging foreigners more than natives, it is to me inexplicable, except such is the case in other countries with American citizens. If it is so, I am ignorant of the fact. However, I should very humbly think, that where, as in the case of the United States and Great

Britain a reciprocity treaty existed, it was contrary to law. An American ship pays the same pilotage as a British vessel in the United States—and *vice versa*: but the amount of the charge rests in the breast of the proper authorities in both countries. The pilot charge in New Orleans, and in Calcutta, are, I suppose, greater than in New York and the British channel. These depend on the local authorities, and these authorities do not look to the amount, but to the value of money; and it would be hard indeed if a Mississippi or a Hoogly pilot should be compelled to labor for the same *amount*, as his brother in New York or the channel. In short, equality in charging the citizens of both countries, is the basis of the treaty; and how, because Great Britain taxes a patentee from the United States £100 or $480, which is just what she taxes her own, the United States, can acquire a right to create an equality of principle, I am at a loss to discover. It would be hard, if the government of the United States charged $1000 for a patent to a citizen, that the British Minister should merely, on that account, increase his $480 to $1000.

G. L. C.

From the New York Journal of Commerce.

PRICE OF BREAD-STUFFS.

We would not needlessly interrupt the enjoyments of those who look forward to the next winter as a time of general starvation. But lest their dreams should be too suddenly broken, we must call their attention to the facts contained in the last news from Europe respecting the prices of bread-stuffs there. We happen to know of an operation at Livorpool, by which fifty thousand bushels of wheat are to be immediately forwarded to this country, and by the prices which are published, there is little doubt that much larger supplies will be soon forthcoming; for the long continuance of high prices, the successful issue of the recent importations, and the fact, well ascertained, that our domestic supplies are inadequate to our wants, will give new confidence in future operations. Let us see at what prices we can be supplied.

In Paris the price of bread is about 2 cents, and in London 3 cents per lb. We found a shilling loaf in New York yesterday to weigh 2 lbs. 3 oz. which is 6 cents per lb. The price of wheat in Paris is 112 cents a bushel, and the price of flour $5 a barrel. In London flour is $8 per barrel. In the ports of the Mediterranean and of the Baltic, bread stuffs are much cheaper than in either London or Paris. The price of good wheat at Naples is 2s. 10d. sterling a bushel, or 67 cents. From any one of these places freight might be obtained at 33 cents per barrel on flour, and 12½ cents per bushel on wheat, or about half the rate charged on transportation of the same articles from Rochester, and one fourth of what is charged from Ohio by one house, at a freight of 49 cents. The duty on flour is one dollar a barrel, and on wheat 25 cents a bushel. Wheat, therefore, can be imported from Naples and laid down in New York at 125 to 135 cents per bushel, all charges paid, and a hundred other places at the same or a less price. Corn and rye are not burdened with a duty, and may be imported to great advantage. The countries of Europe and Asia afford stores of bread stuffs almost inexhaustible, so that the supplies for this country, if they should run to the highest possible quantity, could only affect prices in a very slight degree. Free trade will supply all our wants, and the cost, with a little mercantile profit, will not carry prices above 150 cents for wheat, 100 cents for rye and Indian corn, 50 cents for oats per bushel, and $7 50 for flour per barrel. So let the desponding cheer up, for no one who is industrious and frugal need starve in 1836 or 1837.

For the Farmers' Register.

PRICES OF GRAIN, &c. &c.

Sir—I had scarcely read, with a delight that I am unable to describe, the observations of Taylor of Caroline, on the effect of the funding system, when I encountered the "free trade" doctrine of the Journal of Commerce. Its object was, (after showing that bread was 6 cents per lb. in New York, 3 in London, and 2 in Paris, and that wheat could be had for 67 cents in Naples,) to prove, that if "free trade" (and a long south-west wind, I suppose) was to continue, there would be no danger of starvation in the cities and rural districts of the United States. What is to be done, if owing to bad harvests, or any other cause, Europe should become its own consumer, and cease to be able to export, the sage writer of the paragraph has not deigned to say. But this language more than ever convinces me of the utter futility of the doctrines of political economy, and the *doctrine* so often repeated, and I am almost tempted to say as often refuted by practice, that things will find their own level. Let war be undertaken, or foreign dictation tamely submitted to, because you are literally unable to sustain a contest—and perhaps the corn laws of Britain, and the protection of the agriculturist, will not appear so absurd. But what is the cause of this state of things? The mania for stock jobbing, for banking, for speculation—and much of this based, as is now clearly proved, on fraud and forgery.

The "empire state" boasts of its progress. Virginia and the south, lament their relative decline. Is it to be wondered at, when we see the hot bed system of the one, and the simple cultivation of the other? The southern states are sinking, when the others are rising. Is there no remedy? There is. And it is to be found in the employment of such methods as the youthful state of Georgia has used, in the creation of means, to place within her borders the arsenal of the south, and lay down a rail road from the Atlantic to the Gulf. For while the south has been talking about a scheme, as visionary as its founders, and as impracticable as it is expensive—the forcing the port of Charleston into the position of the emporium of the south—while this has been a subject of speculation, inquiry, and declamatory flummery, what has not Georgia done? She has employed a talented and patriotic member of congress to urge her suit—display the advantages of her patriotism, and has succeeded, comparatively at a blow, in procuring $2,500,000 from the city of Boston, for the purposes I have mentioned. Thus, the name of *Thomas Butler King* will be rendered celebrated, and well worthy of envy and

admiration: but perhaps no less so than the capitalists who have contributed to the fund. Perhaps the sages who projected the rail road to the Ohio, from the Atlantic, and excluded Georgia from "our charter," will now see their folly, and lament their stupidity—especially, if uniting in action, and avoiding the difficulties of complicated legislation, Georgia, Kentucky, and Tennessee should combine, and thus producing co-operation with Virginia, create two outlets, the effect of which, will be to exclude South Carolina from any of the benefits, which, from her language, she so anxiously desires—and this at the very instant when the latter has, in Beaufort, a port more capable of becoming a man of war harbor, and better situated than any other on the Atlantic, south of Norfolk. However, I may seem to be wandering from my subject; and hence, I am led to say that, as a road to market will be one of the best methods to protect agriculture, Virginia, Kentucky, Tennessee, the Carolinas, &c. &c. should, if possible, follow the example of Georgia. Hence, let agents be despatched to Philadelphia, whose intelligent capitalists will doubtless follow the example of Boston and ascertain whether, with her present capital, as much could not be had as would carry the desired objects into effect. The commercial influence she would obtain would be incalculable. I say her *present* capital, to prevent the necessity of such a redundancy of issue as has already inflicted so great a punishment on the country—and on the effect of which, there is too correct a picture to be found in Col. Young's reply to those who ask him to become a candidate for the government of New York. Well, very well, do his opinions verify the sentiments in, I think, No. 12 of Taylor's *Arator*, to which and to his notes, I beg the earnest attention of your readers and yourself. Well does Col. Young observe—

"Whilst legislation is directed, as it ever should be, to the greatest number, laws will be few and simple; but in proportion as it is perverted to the corrupt subserviency of stock-jobbers, speculators, and monopolists, will it become more intricate, protracted, and multifarious. When the immutable truth is fully understood, that there is no possible way of *creating* wealth but by productive labor, it is perfectly apparent that the gains and speculations of the profits of monopolists are extortions upon mankind, in which the few participate at the expense of the many.

Occupied with their private concerns, the great mass of mankind do not always bestow sufficient attention to watch the silent operation of laws, and to trace the connexion of cause and effect. Little by little the aggressions of power steal unperceived upon the body politic, like the debility of age upon the human frame. Twenty years ago, the legislation of the last session, if it could not have been otherwise averted, would have roused the whole community to arms. The undeniable truth that all men are born free, and have equal rights in the enjoyment of life, liberty, and the pursuit of happiness, was not then forgotten or disregarded."

The wise, the intelligent, the provident, in the large towns of the north, must and will second you. When they behold a starving populace calling for bread, (and this, if such doctrines as those of the Journal of Commerce to which I have adverted are sanctioned, they must now in prospective, aud eventually *in fact* will behold,) they will offer their aid to stay the plague of such an excessive issue, and to employ at the same time, their surplus capital as well to insure the safety of their property in general, as to open to their distressed fellows, every channel whereby provisions can be brought to sustain their families, and enable their laborers and artizans, in their turn, to keep society in peace and good order, and to sustain the general interests and manufactures of the country. For, to suppose any progress in either art, science, or manufactures, where provisions are so high, as they are even now, is perfectly ridiculous—inferior wheat being 170 cents per bushel, and Commodore Ballard's 215 cents. In 1800 and thereabouts, if I am not much mistaken, the maximum of wheat, in the grazing county of Gloucester, Great Britain, was 160s. per quarter, i. e. 20s. or 480 cents per bushel; when, in Norfolk it was about half that price. Now, I think it is about 6s. or 140 cents in England. If circumstances of this kind are not calculated to arouse the torpid and awake those that are asleep, I know not what will.

I have referred to *Arator*. I could hope a new edition of this admirable work could be published, with notes correcting the then popular errors of its truly original author, and demonstrating the correctness of his views on agriculture and the monetary system. It would, I am convinced, go far to prove, that if capital is not by the mere force of public opinion and correction of popular error, applied to agriculture, that evil, infinite evil must be the consequence. What have not Sir J. Sinclair, Coke of Norfolk, Lord Somerville, and Francis Duke of Bedford—what have not these men done for the agriculture of Great Britain? And, perhaps, I might ask what would they, what could they have done, without the so much despised, so much abused corn laws? Laws, which have *now* rendered their country independent of others, and at all times able (for such I am convinced will in future be the case,) to supply her population with provisions. This leads me to ask if during some of the discussions in congress, perhaps, in consequence of Mr. Pinckney's urging the embargo as the means of distressing Great Britain, Mr. James Lloyd, then senator from Boston, did not demonstrate, that all the United States ever sent to Great Britain did not exceed a fortnight's consumption for her population? I speak from memory and may be wrong. Mr. Tracy's declaration on Mr. Madison's Resolutions, I believe, will not soon be forgotten. (*Vide* Marshall.)

G. L. C.

P. S. The remedy, I apprehend, will be found to be in the joint stock system, and a final termination to the chartered principle. Charters are the offspring of chicanery, and promoters of peculation. *Why, in defiance of tyranny, corruption, proscription, whether proceeding from the state or general government, will not the bank of the United States, with a capital so diffused as effectually to annihilate all two-penny chartered institutions, be created a general joint stock company?* The state of New York has a law restraining private banking. Where did it get the power to restrain trade in money, any more than it has to restrict a traffic in tin kettles? May this domestic despotism soon reach its period!

REMARKS ON THE WILLCOX GRAPE, AND OTHER SEEDLINGS.

To the Editor of the Farmers' Register.

Petersburg, Oct. 1st, 1836.

Observing in the last Register the request relative to native grape vines, I am induced to send you a piece of the vine of the *Willcox Grape*, with a bunch or two of the fruit attached thereto. It is a seedling—and the only vine known to be in existence, is now growing in the yard in front of the mansion house, at Walnut Hill, the country seat of Mr. J. V. Willcox, near this town. Mr. Willcox informed me, that the vine was found in the woods not far from the house, and he had it removed and planted where it is now growing. I tasted the fruit some years since, when the summer had been dry, and it was sweeter than the fruit now sent you. On sending to Walnut Hill to obtain a specimen of the fruit to day, what I send you was all that remained. Mr. W's. servant had preserved a quantity of them in sugar, and sent me, he being absent, a tumbler full, which were of very fine flavor. This variety deserves particular attention from its color, which is white, and from its sweetness—in other respects it very much resembles the wild summer grape, which ripens first in our woods. It is my opinion this variety would answer uncommonly well to put up in cotton, or sawdust, for winter use. I have made several unsuccessful attempts to propagate from this vine. Like many native varieties it is extremely difficult to raise from slips. I have had the slips sprout and grow till warm dry weather, and then die. I shall try ingrafting next year.

Among the varieties of American vines described by Prince in his Treatise on the Vine, I find no variety like this described, and among all the varieties not one in fifteen is white. The vine is said to have been heavily laden with fruit this year, and I think, for eating, it is preferable to Norton's Seedling.

I will add a few remarks as to my experience in cultivating a few of the native varieties of the vine. The soil of my vineyard, on the Appomattox near town, is what is called, in Prince George, the mulatto soil, and is much stiffer than I would wish it to be for a vineyard. The white Scuppernong succeeds well and never rots or mildews. The same may be said of the "Alexander," and in this respect it seems to me that deserves cultivation in preference to the Catawba or Isabella. The Alexander is a large black grape, and when fully ripe is an excellent fruit. I am trying the experiment of preserving them in cotton for winter use. The Catawbas and Isabellas have generally failed the present season in this part of the country, I presume on account of the extreme wet of the season. Some of the wild grapes in the woods rotted, apparently from the same cause. The Catawbas in my vineyard rotted equally as bad, if not worse than the Isabellas; and there were but few perfect bunches of the fruit of either kind on my vines. Those on the hill side, with a northern exposure, rotted worse than those on a level. A few years since, both of these kinds succeeded remarkably well in this part of the country. It seems to me, from rather a slight observation, that the same weather, which for three years past has blighted much of the wheat crop in this neighborhood, also produced the rot in the grapes. I have strong hopes, that when we are again blessed with a good wheat crop, the Catawbas and Isabellas will return into favor. But it is surely expedient to cut many of them down, and ingraft on the stocks those varieties which never fail to ripen well. The Bland does not generally ripen as well as the Catawbas, and Isabellas on frames. The best I have seen this year, and in fact ever saw grow, are vines which run on trees.

Norton's Seedling is a great bearer, and has not rotted at all this year in my vineyard. But I consider it inferior as a table fruit. In that respect it will bear no comparison with the Catawba, Isabella, Bland, or Alexander. I have them now all ripe together, and can well form a proper estimate of the flavor of each kind.

I have a few more varieties which I have not tested, but they will bear next year. A few vines in the vineyard of the white, red, and black fox-grape, common muscadine, black scuppernong, and Smart's Elsingburg, bear yearly, but they are in my estimation, hardly deserving the soil they occupy.

Feeling a deep interest in the extensive cultivation of the best varieties of native grapes, you will probably hear from me again.

A. B. SPOONER.

From the Genesee Farmer.

LIMING DESTROYS MALARIA.

It has been already shown in this journal, that one of the most important uses of lime is to absorb the gases which arise from fermentation, and which constitute the food for plants. Some of these vapors are mephitic; and it follows as a necessary consequence that their absorption by the lime must render the locality more salubrious—converting the poison into aliment, the nuisance into a blessing. We are not positive, though we are inclined to believe, that E. Ruffin was the first writer who brought the subject fairly before the public. It has also been mentioned however, in an English work, the "Journal of a Naturalist;" and M. Puvis speaks of it in decided terms.

The author of the excellent "Essay on Calcareous Manures," has proposed the introduction of *Marl* into towns and cities, to purify the streets, cellars, and back yards; and in our opinion no proposition of more importance has been made in modern times. There is reason to believe that had this measure been employed in 1832, thousands of our citizens might have been saved from the Asiatic Cholera. It is well known that a great disparity in cleanliness has existed between the different cities; and a corresponding disparity in the number of deaths at the time of that awful epidemic; yet in no case that we are aware of, have the streets been cleansed except by water or by scraping. These methods however are not entirely efficient. Filth will settle in between the paving stones, which neither method, under ordinary circumstances, can remove; but which *marl*, as if by magic, would render perfectly harmless. "The Conservators of the Public Health" possess great power, and ought to use it.

"The streets ought to be sprinkled with marl," says the last mentioned writer, "and as often as circumstances may require. The various putres-

cent matters usually left in the streets of a town alone, serve to make the mud scraped from them a valuable manure; yet the principal part of the bulk of street mud is composed merely of barren clay, brought in upon the wheels of wagons from the country. Such a cover of calcareous earth would be the most effectual absorbent and preserver of putrescent matter, as well as the cheapest mode of keeping a town always clean. There would be less noxious or offensive effluvia, than is generated in spite of all the ordinary means of prevention; and by scraping up and removing the marl after it had combined with and secured enough of putrescent matter, a compost would be obtained for the use of the surrounding country, so rich and so abundant that its use would repay a large part if not the whole of the expense incurred in its production. After twenty years of such a course, the surrounding farms might be capable of returning to the town a ten-fold increase surplus product."

Those who are habituated to breathe the pure air of the country, become very sensible of the noxious exhalations of the streets when they visit our cities, especially in the morning in hot clear weather before the wind rises, as it generally does, in the forenoon. But some localities are offensive at all seasons of the year. This is the case with slaughter houses; and it would be no unreasonable stretch of prerogative for our city and village authorities to insist on the abatement of such nuisances by a liberal application of *marl* or quick lime. The *former* is the best for the following reasons: "Quick lime forms new combinations with putrescent substances and in thus combining throws off effluvia, which though different from the products of putrescent matter alone, are still disagreeable and offensive. Mild lime on the contrary, absorbs and preserves every thing."*

It may now be proper to furnish some evidence of the salubrious influences of lime in the soil.

"My principal farm," says E. Ruffin, "until within some four or five years, was subject in *a remarkable degree* to the common mild autumnal diseases of our low country. Whether it is owing to marling, or other unknown causes, these *bilious diseases have since become comparatively rare.* Neither does my opinion in this respect, nor the facts that have occurred on my farm, stand alone. Some other persons are equally convinced of this change on other lands as well as on mine."

He afterwards says in 1835—"The foregoing was first published in the Farmer's Register for July, 1833. It is proper here to add, that the two autumns that have since passed, have brought no circumstances to weaken the opinions advanced, and many that have served on the contrary to strengthen them."

A correspondent of the Farmers' Register says, "The streets of Mobile are generally unpaved; and as a substitute for stone or gravel, which is not to be obtained, *shells* which have long been untenanted, are strewn over the carriage ways and side walks to the depth of several inches. These soon become a firm mass, and form a smooth surface, so as to resemble a M'Adamized road. The shells which are of various kinds and generally small, are raked up in great quantities in the shallow lakes, and brought to the city in large lighters. *Mobile is much more healthy now than it was before this plan of improving the streets was adopted.*"

Another correspondent of the same paper, subsequently says, "A few days ago I saw a near connection who has just returned from a settlement which he has made on the Black Warrior, about fifty miles below Tuscaloosa. He spoke of the fact that *Mobile had become much more healthy within a few years*, without however assigning any cause. He also represented a very large portion of that country between Tuscaloosa and Mobile, as *calcareous*, and abounding in *shell marl* or soft limestone. He says the country, if not more healthy, is certainly not more sickly than this, [the middle and hilly region of Virginia,] and that it appears to be *generally understood there that the marl preserves it from disease.*"

It appears from a letter dated at Mobile and published in the Farmers' Register, that until the year 1827 it was "counted unhealthy," not only because yellow fever had "raged like a pestilence" at different times, but also on account of bilious fevers. Various improvements however, were in progress, such as raising the streets above high tides, erecting brick buildings, &c. The writer says, in reference to these improvements, "Since 1827 the effect on the comfort and *health* of the place is abundantly obvious. Every street is *shelled*—all the alleys—many of the yards—all the public ware-house yards, and the tavern yards, are *shelled*—several of the streets are shelled for half a mile back, and one that meets a leading road is shelled over a mile—many of the cross streets are shelled, and ere long every street in the city will be shelled—it is indeed the settled policy. *Mobile has been uniformly healthy since* 1827. Last fall and this summer, while the Cholera raged so fatally in New Orleans, Mobile was visited with very few cases, and they excited little or no alarm. The deaths were four or five."

In another communication to the Editor of the Farmers' Register, it is said, "There is another fact connected with this part of the subject that strongly corroborates your views regarding the healthy action of calcareous earths on putrescent matter. The fact is that *the prairies have proved to be the healthiest part of the state*, notwithstanding the water is to all appearance bad, and is very unpleasant to the taste,"

A correspondent of the Southern Agriculturist, in referring to the prairies of Alabama, writes as follows: "I think the country more healthy than South Carolina, owing in part to its being more high, dry, and broken, and more under the influence of the strong trade winds; but *there must be a further reason*, because I have seen local causes enough to produce sickness here, in spite of the general causes of salubrity. Families reside with security on their prairie plantations all summer, in the midst of extensive clearings of rich land. *I think it must come from some purification of atmosphere arising from the immense quantity of lime on and near the surface of the soil.* The other lands in that country under similar circumstances, are not more healthy than in South Carolina."

We shall now present extracts from the "Essay on the use of Lime as a Manure." After referring to emanations which attack the health of the inhabitants," M. Puvis says, "This unhappy effect appears almost no where in calcareous re-

* Essay on Calcareous Manures.

gions: the margin of lakes and ponds there situated, do not produce the same unhealthiness, and even marshy grounds there are less unhealthy.

"Linnæus thought that the unhealthiness of most countries depended on the nature of the water, and was owing to the argillaceous particles which they contain. Now these *argillaceous particles are always precipitated by the calcareous compounds.* For this reason, the waters which stand upon, or run over marl or calcareous rock, are almost always *limpid and clear.*

"We are not far from believing then, that throwing *rich* marl or lime, into a well of muddy and brackish water, might have the effect, in part at least, of *clearing* it, and making it healthy to drink.

"Lime in all its combinations, destroys the miasmata dangerous to life. Its chloride annihilates all bad odors, arrests putrefaction, and in short, has subjected the plague of Egypt to the skill and courage of Paristo. The white-wash of lime upon infected buildings, upon the walls and mangers of stables, is regarded as serving to destroy the contagious miasmata of epidemic and epizootic diseases.

"The limed soil then, to the depth it is ploughed, ought to change its emanation as well as its products; and if the lower strata or subsoil send up emanations, these effluvia in passing through the improved layers of the soil, where the calcareous agent is always at work and developing all its affinities, ought also to be modified, and take the character of those of the upper bed. The limed soil then, it would seem, ought to be made healthy.

"But what we maintain here by induction, is fortunately a fact of extensive experience. *Among all the countries in which lime has carried and established fertility*, there is not cited that I know of, *a single one where intermittent fevers prevail*—while they have *never disappeared* in a country, even where an active culture draws good products from the impermeable argilo-silicious soil.

"To extend the great benefit of healthiness to the whole of a country, it is no doubt necessary that the whole country should receive this *healthgiving agent.* On every farm, in proportion as liming is extended over its surface, the chance of disease will be seen to diminish; and *the healthiness of the country will keep pace with the progress of its fertility.*"—*Far. Reg. Vol.* 3.

TO GUARD HORSES FROM FLIES.

Farmers might easily save the flesh of horses and cows, and confer great kindness on their animals, in preventing the usual annoyance of flies, by simply washing the parts with the extract of pennyroyal. Flies will not alight a moment on the spot to which this has been applied. Every man who is compassionate to his beast, ought to know this simple remedy, and every livery stable and country inn, ought to have a supply on hand for travellers.—*Yankee Farmer.*

From the Southern Agriculturist.

INDIGO.

Indigo is made from the *riadigofera tinctoria.* The Spanish indigo is said to be the best in the world, but it is a fact, American, being produced in the province (now state) of Guatamala. Formerly it was made in this state for exportation, but gave place to cotton. The latter is so generally cultivated now, that attention may be very profitably directed again to indigo. When we abandoned the cultivation of it, some years past, there was comparatively a small demand for it, in this country and Europe. A vast proportion of the goods colored with that die, was imported from the East Indies; consequently the market for American indigo was extremely limited, and the planter gladly turned his attention to an article promising as good returns, and more ready sale. It was certain that cotton manufactories were rapidly progressing in Europe, and would consume all we could supply them. We had no glut to fear: consuming their fabricks, it was but natural they should give our raw material the preference. It is easy to overstock a market with dye-stuffs, but difficult to do so with the matter to be colored. This led to the abandonment of indigo, and now this country has to import large quantities for home consumption. We have now a home market for the article, with a daily increasing demand. The coarse goods we formerly imported from the East Indies we no longer see. We substitute European and American fabrics, which fabrics absorb vast quantities of coloring, and cause a consumption of indigo unknown in Europe and America, when that dye occupied the attention of our farmers. The supplies drawn in those days from North and South America, have dwindled down to almost nothing. The United States produce *none*, and the unsettled state of the countries formerly under the Spanish and Portuguese governments, must for many years to come, render supplies from that quarter both *partial* and *precarious.* It is evident, that while the demand for indigo on both sides the Atlantic is immensely greater than it was fifty years ago, the supplies from all countries upon the ocean north of Cape Horn, are diminished in the same ratio. As a home market is open for *large* quantities, I cannot but believe, many would find it to their advantage to substitute indigo for cotton. *Many* years must elapse, before we can produce more than a sufficiency for home consumption, and again become exporters. The supply of our own market is, I think, a sufficient inducement to cultivate the plant.

"The seed may be sown at all times, but spring is the best, and the species named in this communication makes the best indigo. It should be planted in good smooth soil, well tilled and not too dry, in furrows about six inches wide, two inches deep, and twelve apart. It must be kept clear of weeds. The plant ripens in about two months. When it begins to flower, cut it with pruning knives, and again every six weeks if the weather should be a little rainy. After two years, it degenerates and must be plucked up. The leaves and small branches should be gathered with great care, to avoid the shaking off the farina that lies on them, which is very valuable. Throw them into a large tub, or vat, with water, for fermentation, which will be completed in twenty-four hours at most. By means of a cock, or spigot, draw off the water into another tub or vat, called the mortar, or pounding tub. The steeping (or first tub) is cleared out, filled again, and so on. The salt of the plant must be separated by agitating the water in the mortar, by using wooden buckets full of holes, fixed to long handles. Be very careful

in this part of the process. If the agitation be too soon stopped, the part used for dying, not being sufficiently separated from the salt, would be lost. If agitated too long after the salt is out, the parts remaining will form a new combination. The salt reacting on the dregs, will produce a second fermentation, change the color and make what is called burnt indigo. This will be prevented by close attention to the color, and changes of the dye, by drawing a little from time to time, into a clear vessel. When the coloring particles collect, by separating from the rest of the liquid, quit using the buckets, and let the dregs settle to the bottom. Holes in the tub, or vat, at different, but regular intervals of height, previously made and plugged, must now be opened, and the *clear* water drawn off. See that the water is clear before this is done, so as to secure every particle of dye-stuff. The dregs remaining are then to be drawn into the third tub, or vat, which is the settler. The water floating in this last vat, is to be withdrawn by means of a small perforation, minutely made above the dregs. When this is done, put the dregs into sacks, and when the drain of water ceases, put the indigo into chests or small boxes. At the end of three months it will be perfectly dry, and ready for sale any where."

"A hint to the wise is sufficient." Indigo requires no expensive machinery to prepare it for market. Every farmer can purchase a molasses cask, and make of it two tubs. Every one who knows the use of the saw and plane, can make a vat, perforate and spile it, and then make boxes or chests, for the indigo. The indigo planter will pay no toll of 6, 7, or 10 per cent, and his valuable commodity being less bulky, will pay less carriage than cotton, rice, or sugar.

From the Genesee Farmer.

NOTES OF OUR TRAVELS.

Having lately travelled through several counties of this district, we propose to detail some of the observations and reflections which we made on the journey.

In the valley of Salmon Creek in Cayuga county, we observe that the leaves of the Indian corn had become discolored and sere, in consequence of frost which happened some time in last month. In the more open country, however, subject to a free circulation of air, we saw no such effects; but on the morning of the 6th inst. another frost occurred, which we believe has not been equalled in severity so early in the season, since the year 1816. The Indian corn and buckwheat in many places, were nearly destroyed; and in most places more or less damaged. The potato tops also in low situations in the counties of Wayne and Seneca, were killed to be ground.

This calamity in connection with the light crops of wheat, will render it the duty of every farmer to save every thing that is suitable for human food, fattening his pork and beef on such articles as cannot be kept till next summer; and even then we apprehend that the *poor* on the rugged sterile hills and in many of our cities and villages, will be subject to great privations. Our canals, by furnishing the means of cheap transportation, will do much towards equalizing the prices of breadstuffs; but if there are not provisions enough in the country to support the inhabitants, as many persons seriously believe, the calamity will be lessened but not entirely removed. We are not *alarmists*, but we think it well to look out ahead.

We have rarely had so good an opportunity to observe how very unequally the frost has operated in the same field. In some low grounds where the corn and buckwheat have been generally killed, small elevations in the surface of not more than a foot or two, *seem* to have preserved the plants in their full state of greenness; but on the contrary, in one potatoe field the higher part was damaged, and the lower part untouched. On inquiring into the particulars however, the same principle appears to have operated. The higher part of this field is mucky or spongy, while further down the slope the ground is dry and solid, showing that more depends on the *texture* of the soil, than on its relative *altitude*. The first case we have mentioned will not convince but rather confirm the opinion, though altitude doubtless, has an effect; and in some cornfields extending from the flats up the hillsides, the greenness which increased with the ascent, might properly be ascribed to both circumstances.

But how do these circumstances produce such phenomena? We presume it will not be difficult to explain. Frosts which occur near the close of spring, or the commencement of autumn, are chiefly owing to two causes; radiation and evaporation. In some of our earlier volumes, we have noticed that the heat in a metallic vessel filled with hot water, may be let off six times as fast, simply by painting its surface black. This result is entirely independent of the contact of cold substances; and the open ground may freeze when the temperature of the air only a few feet above it, is ten or twelve degrees warmer. At present we shall be brief on this subject. When the heat radiates to a *clear* sky, it is lost in the depths of ether; and when it is *calm*, the warmer air above is not whirled down on the surface. It is partly owing to these causes, that frost in moderate weather, can only occur under a *clear, calm* sky.

We may take a further view of this matter. Professor *Leslie* has shown that surfaces which most rapidly absorb heat, also radiate it most freely. The property of black soils in this respect is well known; and hence, we may expect them to be more subject to vernal and autumnal frosts than pale colored soils.

But the effects of evaporation must also be taken into the account. Some idea of its amount may be conceived by those who have watched the fog spreading over meadows in a calm evening. These exhalations rise so much more freely from black spongy soils, that the depressions of the land may be traced out by the fog that covers them; and it is along such winding swales that the corn and potatoes are most commonly damaged by the frost. It may be said indeed that fog keeps off the frost; but the atmosphere is not always in a state to condense the vapor which rises, though it is *then* invisible, and which requires for its production a large supply of heat. This heat is abstracted from the soil which cools rapidly in consequence.

At Waterloo we listened to a conversation on the course which a farmer ought to pursue when his corn has been struck by the frost so early in the season. Had the crop been more mature, all

would have been in favor of cutting it up without delay, and setting it in small stooks; but its greenness in the present case, caused an objection. One old farmer said that corn would ripen when deprived of its tops by the knife, and why should it not ripen when deprived of its leaves by the frost? But not all the leaves were killed, and the juices were fresh in the stalk. He thought the best management was to let it alone.

We listened without speaking, but we have since been told by some who have examined ears of corn from time to time, that there is a prospect of its ripening much better than was expected. We allude to that which remains uncut.

Some farmers however, have tried the experiment of cutting up a part and leaving a part to stand; and we hope to be favored hereafter with the result.

On some farms, we observed that the old practice of topping corn still continues; but we believe it is entirely confined to the old fashioned farmers: *such as know too much to need an agricultural paper.* We are not ambitious to undertake the task of instructing them, but our readers may do well to remember that exact experiments have shown a great loss from that kind of mutilation. The leaves are a most important appendage to the plant. In these the *sap* is elaborated into *juice;* and fruits deprived of this benefit are generally, if not always, insipid or nauseous. Strip the vine of the leaves and the grape is worthless. Whether the *flavor* of corn is materially injured by this process, or not, we cannot say; but the loss in *quantity* admits of no dispute. Ch. Woodson, of Virginia, had the tops and blades taken from several rows of Indian corn, leaving the same number of rows untouched; and discovered when the grain was harvested that the corn of the unmutilated part, *weighed more than the corn and fodder put together* of the part which was topped and bladed. He says, "the whole labor of gathering and curing the fodder and tops (no inconsiderable item) was entirely lost."

As the subject is one of great interest, we *again* present to our readers a remark of the editor of the Farmers' Register which was appended to the communication: "If the absolute loss of labor in this usual and long prevailing practice of Virginia, is as great as we have supposed, and even half as great as may be inferred from the result of this experiment,—the amount of *the whole annual loss* and tax so paid, IF SAVED, *would be enough to defray the cost of constructing all the canals and railways now in progress in the state*, and *the expenses of the General Assembly to boot.*"

From the Genesee Farmer.

LOSS OF WEIGHT IN RIPE GRAIN, FROM DRYING.

In the Georgical Essays, it is stated that, from experiments carefully conducted, it was shown that wheat, gathered ripe, lost in 49 days nearly one-tenth of its weight; barley in 40 days lost one-seventh of its weight. This was in September. In October wheat lost in 24 days 2 lbs. 1 oz. in the bushel of 70 lbs. Grain stacked till April, sustained a loss of nearly 35 per cent. The Farmers' Magazine states, that Indian corn gathered dry and shelled in October, had lost in the May following, nearly 7 per cent. in measure. This was in England; in this country but few experiments of this kind have been conducted; and it is very desirable, in order that all interested in the selling and buying of grain may fully understand the ground they are going upon, that this subject of the shrinkage of grain should be properly investigated. Every farmer knows that grain shrinks rapidly, though the exact amount is rarely made the subject of calculation.

If the above estimates are correct, and we know no reason why they are not, farmers should calculate carefully the probable chances of a rise in the price of grain, before they conclude to keep theirs on hand for any length of time, or over the winter. That the loss, in shrinkage and wastage, in a lot of wheat kept from September until April or May, will fully equal 10 or 12 per cent. we fully believe. In other grains the loss would be still greater. Unless, therefore, a farmer has well founded expectations of quite an advance in the spring prices over those of the fall, it is clearly his interest to thrash and sell as soon as the fall prices are fairly established. The calculation of chances is, however, rather nice work for the farmer, and the best rule for him to adopt is, to dispose of whatever he has to sell, whenever an offer is made giving a decent profit on the cost of production.

From the Quarterly Journal of Agriculture, for June.

ON PRESERVING POTATOES AND RAISING THEM FROM SEED.

By Sir G. S. Mackenzie, Bart.

The Highland Society, always anxious to procure information, has offered a premium for the best and approved account, founded on experience, of the most successful method of preserving potatoes in good condition, in their natural state, for a period of not less than ten months from the time of their being taken up. I hope to be able to give to the Society satisfactory information on the above subject, having paid long and particular attention to the potatoe, and to state some circumstances which do not appear to be so generally known as I presumed they were until I saw the offer above quoted.

Of various methods I have tried for preserving potatoes from frost, that practised most commonly seems to be the best, viz: Making a shallow pit about a foot and a half deep, on a dry spot, and heaping the potatoes like a roof to the height of about four feet. On the heap thus formed, straw is laid to the thickness of about eight inches, and over this the earth taken out of the pit—the whole being beaten firm by the back of a spade. Some time about the end of February, or beginning of March, the pit is opened, and the potatoes turned over, all the shoots being picked off. I may here remark, that where a few side roots have proceeded from the shoots, I have planted them, and had almost as large a product as from sets. The mode of planting them is to cut a drill with a spade so deep that the shoots may be covered about two inches. They are laid inclined upwards towards the soil, covered, and another drill made, and so on. The only risk is from frost; for if once nipt down, their shoots do not recover so readily as

those from sets. On this subject I beg to add, that for early potatoes it has long been my practice to spread sets on the floor of a vinery, or on a hot bed in March, with a little sand over them. By the time there is little risk of frost, the shoots are long enough for the sets to be planted out about the middle of April. I have frequently had the shoots nipt down, but they always recover; that is, new shoots spring up in a very short time, and I never observed that this made any difference in the period of the tubers becoming fit for use. The early potatoes I use are the London early for the first crop; some of my own, which is a little later, and remarkably mealy for an early potato. After the heap is turned over, as I stated above, it may be again covered, and the potatoes allowed to remain a month longer, after which they should be removed to a barn or shed, and picked. They should now be frequently turned over, and picked free of shoots. If the eyes of a potato are scooped out, it will gradually dry, if properly exposed; and it may then be scraped into flour, though not very white. In this state they will keep for an indefinite time: and there is no risk of their becoming mitey, as flour does. Dried potatoes might be found useful during long voyages, though potato flour is better.

It ought to be made generally known that there are varieties of the potato which, though sufficiently protected from frost, will not keep *under any management*, for more than a few months. Do what we will they decay, owing to their natural constitution; other varieties again will keep very long without any trouble. Hence the Society's proper object is not to offer a premium such as the one which has given occasion for the present communication, but to offer one for raising new varieties, and producing one or more with as many as possible of the qualities which a potato is desired to possess. The same observation applies to the keeping of apples and pears, and various fruits and roots. Long keeping is a particular property belonging only to some, and not to all varieties.

Some varieties of the potato are best for the table early in winter, and others are best in spring. Instead of having the trouble to raise different sorts, for different seasons, it is best to sow seeds, and to procure a number of varieties in this way for selection. It is now about twenty years since I first began to raise new varieties; and I will now state my mode of proceeding, that others may follow it if they think fit.

I first noted down the qualities which it was desirable a potato should have. These are, 1, dryness, or mealiness; 2, agreeable taste; 3, moderate size; 4, regularity of shape, not having deep eyes; 5, not bursting when boiled; 6, not having a tendency to shoot at an early period; 7, long keeping; 8, productiveness. Among hundreds of varieties I have not found one possessing *all* of these qualities, but I do not despair.

Having gathered the apples from different varieties, I keep them till spring, when I open them, take out the seeds and dry them. A piece of ground being prepared by digging in some manure, but sparingly, and the surface being finely raked, the seeds are dropped thinly into shallow drills, two feet asunder. When the plants appear, they are thinned out to eighteen inches in the rows, and I have usually selected the strongest. Those taken out may be transplanted to another spot. As the plants grow, the earth may be heaped round them. I have observed that, with some exceptions, those plants which flower the same season seldom produce tubers. My experience has proved that the produce of the first season is not to be relied on as an indication of future productiveness; therefore no seedling should be rejected the first year. I recollect a plant that produced but one tuber, about the size of a walnut; this produced the second year, one hundred and twenty tubers of good size; but this degree of productiveness did not attend succeeding generations. I have observed, in general, that rough or scaly skinned potatoes are the driest, and often too, the earliest. I plant every tuber produced the first year, that is not less than a pea—for should one hit on a good variety, it is then more rapidly increased: it is but a lottery, and some space of ground must be allotted to the drawing of it. I have had as many as three hundred varieties growing at once. Of course each variety must be tallied, and a memorandum kept of every thing connected with each. Each variety should be tested the second year, at the time it is taken up, and again in the spring, and those that are good at both seasons preferred for future trial. Indeed, all may be rejected but the one that has the greatest number of qualities noted. In this way every one may procure sooner or later a good variety of potato. It is of the greatest importance to procure in this way—for difference of soil, and even perhaps of situation, seems to have singular effects—a fine potato in one soil proving bad in another, and *vice versa*. I have one variety that possesses the 1st, 2d, 4th, 5th, 6th, and 7th qualities, which I have cultivated for about 18 years, and I have not yet succeeded in raising a better. It seldom, however, yields above twenty bolls an acre, of old Ross-shire measure, the peck being fifty-six pounds. Though there are many sorts more productive, yet this potato, keeping very long under the management already described, has brought it into very general use in this quarter. I have had young potatoes of this sort, of tolerable size at my table along with tubers of the previous year. It is ripe by the middle of September. During the two last seasons, the sets of potatoes decayed in many places. None of my own were affected, but some of my tenants lost large patches. I observed a wire worm on some of the decayed roots, but whether this worm was the cause of the failure, or the failure of the sets induced the insect, from whose egg the worm proceeded, to lay them on the set, I could not ascertain. It often happens that effects are regarded as causes in such matters. It is my practice to have the potatoes cut into sets, and spread out to dry during ten days, or a fortnight, before planting them. This serves to prevent the risk of their rotting in the ground. But I have known sets of some varieties rot soon after the appearance of the plant above ground; and others I have taken up sound when the crop was ripe. Thus it is clear that long keeping does not depend on the *mode* employed, to preserve potatoes, but on the natural quality of a variety; and the varieties ought to be increased from seeds until the qualities I have enumerated are found in one, or at least the most important of them. It is the opinion of some that the productiveness of potatoes decreases by long cultivation. I doubt: at least, it has not occurred

to my observation. If a variety be planted on a soil different from that in which it has succeeded, it may fail, and I have known this to happen.

On the whole, I conceive that the object of the Society can be best attained by the recommendation to every one interested in the culture of potatoes, to raise new varities from seeds. Seedlings rejected, I mean the second year's produce, need not be thrown away, but given to cattle or pigs, so that the space occupied by the plants cannot be said to have been misapplied.

Since the above notices were written, extensive and accurate experiments have been made in the garden of the London Horticultural Society, in reference to the question, whether it is best to plant sets or whole potatoes. I had long since found that sets were best. The first experiment made, seemed, however, in favor of whole potatoes; but I pressed a repetition, and also repeated the experiments myself, and the question has now been finally decided in favor of sets. It might perhaps be of use that a well prepared abstract of the papers in the horticultural transactions should be drawn out for the *Quarterly Journal*. A great deal of nonsense has been published about the remarkable failures of the potato crop in different places. The thing is still a mystery, which may not be cleared up for some time. It appears that early planting gives heavier crops than late planting.

TO PREPARE ORCHARD GRASS SEED FOR SOWING.

The best seed is liable to fail, and this is the only difficulty, of any consequence experienced in the cultivation of this desirable and productive grass.

It is recommended to prepare the seed for sowing, so that it will come up, and grow as well as any other grass seed, to moisten the seed before sowing by spreading it, not very thin, on a floor, and with a watering pot sprinkle the seed pretty well, then mix all well together with a rake; if it does not appear damp enough next day, add more water, the seed being light it will absorb a good deal; and immediately before sowing, spread as much plaster of paris as will bring it to a good state.— *Yankee Far.*

EXPERIMENTS WITH MIXTURES OF ASHES, GYPSUM, LIME, &c. APPLIED TO CORN, WHEN PLANTED.

To the Editor of the Farmers' Register.

October 9th, 1836.

Should the following statement of experiments, made in planting this season's crop of corn, (though presenting negative results,) be thought of any importance to the readers of your valuable Register, it is at your service.

Experiment 1st.—2 bushels of leached ashes, and 1 bushel of gypsum.

Experiment 2d.—2 bushels of unleached ashes, and 1 bushel of gypsum.

Experiment 3d.—1¾ bushels of unleached ashes, 1 bushel of gypsum, and 1 gallon of salt.

Experiment 4th.—1¾ bushels of unleached ashes, 1 bushel of gypsum, and ¼ bushel of caustic lime.

The above four compounds were separately applied on a marked length of five rows, at the rate of a full handful to each hill of corn, previous to covering, with six rows intervening between each experiment without any application—the soil of the whole being of good quality, and presenting a favorable opportunity for judging of the results.

Experiment 5th.—17½ bushels of leached ashes, 5¾ bushels of gypsum, and two bushels of caustic lime: this mixture was also applied at the rate of a full handful to each hill of corn, with intervening rows without any application.

Experiment 6th.—16 Bushels of unleached ashes, 5½ bushels of gypsum, and 2 bushels of caustic lime, applied in the same proportion to each hill, as in the preceeding experiments, and also with intervening rows without any application.

Experiment 7th.—20 bushels of gypsum, 2 bushels of caustic lime, and 2 pounds of sulphur: this mixture was applied in various proportions, from a handful to 2 hills of corn, to the same quantity on 4. Connected with and forming a part of this experiment, were 5 bushels of gypsum deprived of its water by heating, and applied at the rate of a handful to two hills of corn. A few days ago when cutting down this corn, I found that the gypsum, though artificially deprived of its constituent proportion of water, had on coming in contact with the water in the soil, re-absorbed it, and formed into a hard cake, very slightly mixed with particles of the soil: from this I infer that gypsum thus prepared, cannot properly or beneficially be applied in such quantities as in the above experiment. None of the gypsum used in this experiment without being deprived of its water, though applied in the same quantities to each hill, can now be seen.

These experiments cover a space of ground altogether, of nearly 40 acres, on soils presenting considerable difference, and so arranged as plainly to exhibit any benefit which might have been derived from them, and every care was used in the due application of the different mixtures, and not without hope of considerable benefit: in this, however, I am disappointed, as not the slightest apparent benefit has been derived from any of these experiments.

Similar experiments made with ashes and gypsum by others, as reported in the Register, and other agricultural periodicals, present highly beneficial results, not only in the increased growth of the corn, but in protecting it from the ravages of insects and crows. In this latter supposed benefit, I derived as little apparent good as in the growth of corn. What causes may have operated to produce this difference in results, in experiments so nearly alike, cannot probably be accurately known. All of the soil on which the above experiments were made, had been rendered calcareous by the free use of marl, which may so far account for the want of benefit from the application of the ashes and lime. That no benefit was derived from this liberal use of gypsum, I attribute to the soil already containing a sufficient proportion of that combination of lime for fertilizing purposes. In this belief, I am strengthened by having applied it to clover sown amongst the corn in the same field, and adjoining these experiments: a

part of the clover was left unplastered, and exhibits no inferiority to that which had gypsum applied at the rate of 1 bushel per acre.

The expense attending these experiments was considerable in point of labor—at least doubling the expenses of corn planting—and in this case, without any remunerating results: notwithstanding which, I am still of opinion, that on soils not calcareous either naturally or artificially, this mode of applying ashes would be attended with highly beneficial results, as experience has proved that sulphate of lime is inert on soils that are not calcareous.

N. L.

For the Farmers' Register.

FRAGMENTS OF MY MEMORANDOM BOOK.

[Continued from No. 5.]

January 6th, 1833. At two farms of Mr. G——, on Chickahomony Swamp, and his residence on the Brook, within Henrico, and about 6 miles from Richmond. On Mr. G.'s land, and in that neighborhood generally (from 1 to 3 miles of the granite ridge) there is found an abundance of fossil shells, and their remains, in a form and appearance differing from all that I have seen. In most of the ravines may be seen a wet blueish clay, which contains no shells, and no calcareous matter—but is full of the hollow forms or moulds of shells which have disappeared. In this respect, this clay is like the gypseous earth which I have found (and elsewhere described) in Prince George—and from Mr. G.'s description of this, presented to me though the *Enquirer*, I at first thought it to be also gypseous earth. But if it is so, it must have lost all or nearly all the gypsum into which the shells were changed, as is the case generally in our gypseous earth on James River—and this loss seems inevitable in the Henrico earth, as it is always found wet. This earth after being dug, and exposed a day or so to the air, gives out a strong and offensive sulphureous odor—which is not the case with our gypseous earth, but is (in some degree) with the marl of Dr. W. Cocke, on Blackwater, in Sussex. Wherever Mr. G. has dug through this earth he finds that it changes to *marl*, or in other words, the *shells* are found instead of their empty places. The first shells found where the change takes place, are more or less colored brown, like rusty iron. Judging by my eyes only, I should think this marl poor in calcareous matter, the only ingredient that I have much experience of, or have found of much value: but it may be that the sulphur, or sulphuret of iron which is also here present, may increase the value of the manure. None has yet been used for manure, nor has a sufficient depth been dug, to furnish fair samples of the body. No attention was paid to the existence of marl in this part of the country until very lately: but though none has been tried, it has already served to raise the price of land.

Chickahomony Swamp here first came under my observation. Its growth of timber shows that it never has been exposed so much to inundation as Blackwater: though both these, and many other swamps in Lower Vrginia agree in the general characters of being remarkably flat, and subject to frequent and long inundation, for want of sufficient passage way for the water. They also agree in the ease and cheapness with which they might be drained by opening the main passage throughout—the vast quantity of valuable land that might be thus reclaimed—and also in the strange neglect of those interested, of this great profit which might be thus obtained at a small expense. This neglect is the more remarkable here, because a canal 24 feet wide has already been carried through the swamp at this place, but which was not continued to the open navigable water of Chickahomony. This operation has furnished a practical proof of the importance of continuing the work, not only for profit, but to prevent increased evils to the lower proprietors. The water from the heavy rains, being now unobstructed, passes down the canal so rapidly as to inundate the swamp lands below, where the obstructions remain, much more than formerly. Yet even this does not cause the canal to be continued. Where I saw the canal, the water passed with a velocity that would not have been supposed by those who have only seen such swamps, before any obstructions have been removed. The depth is sufficient for navigation in flat boats, though no use is made of it for that purpose. In dry seasons in summer, it is a mere rivulet. I have often urged the general draining of Blackwater Swamp, by a continued central drain--and have thought that 10 feet width and 4 feet depth might suffice for that purpose, and that the expense would not exceed 50 or 70 cents the running yard. Here 24 feet is the width, and is not too much: but the cost was far below my estimate, having been contracted for at only 25 cents. The cause of this remarkably cheap price was that the canal was carried generally along the former crooked course of the main body of water, which being often deep and wide enough for considerable distances together, lessened the labor of digging—though by this plan the course is longer and more crooked, and the draining less perfect than if a new and more judicious line had been adopted. So in Blackwater Swamp, the water in the main passage is sometimes for hundreds of yards together, deep enough for keel vessels, and then is obstructed and scattered by a *raft* of fallen trees, and the rubbish they have stopped. The reclaiming of these swamps would be as profitable, as it is otherwise on the tide marshes. Yet the first has no where been effected (on a general or proper plan) and the latter is continually attempted, in spite of all previous failures. The cause of the difference is, that it reqnires the combined efforts of numerous landholders to drain an extensive swamp, and a single stupid or obstinate proprietor may stop the whole work—and our still more stupid laws, (which might be supposed to be made by the enemies of agriculture,) afford no redress. The land of a single minor, or life owner, lying in the route of the proposed canal, is sufficient to prevent its being carried into effect. And this sacrifice of value, and other like consequences, are owing to the scrupulous care (so called) which our law takes of the rights of property, and especially of the property of widows and orphans!

The timber of Chickahomony Swamp at this place is generally of ash and gum, but is partly of large willow-oak, which is of considerable value. The soil is sometimes sandy, and sometimes a cold stiff clay, neither of which is very rich for swamp land. But the *mud soil*, which forms the

remaining class is remarkably fertile. None of the main body of swamp land on the canal is fit for grain crops. On the outskirts and higher parts not exposed to inundation, corn is cultivated to much advantage. Mr. G. showed me a body of about 70 acres of a remarkably black rich though silicious soil, full of vegetable matter, which differed in appearance, and greatly surpassed in value, all the adjoining swamp land. This rich tract lies at the outlet of two streams, which must formerly have overflowed it: and into these two streams run all the smaller streams and ravines in which marl has been found.

Mr. G. has found gypsum to have beneficial effects on clover on his highland surpassing any I have experienced or heard of on soils of similar appearance: and indeed he has succeeded in raising clover without gypsum on land, that from its appearance I should not think capable of keeping it alive. The time of year, and the previous grazing forbade much *show* being made by the clover: but its being alive, and well set, proved to me that the soil of this neighborhood must have been originally much better than it now appears. The soil is a gravelly gray loam, on a red clay subsoil. Its product Mr. G. has found to be always increased by very deep ploughing, which he gradually arrives at, by deepening the furrow an inch at each cultivation. He has been but a few years in possession.

The land of this neighborhood is high, and much of it hilly. Mr. G. uses to much advantage, a very simple *hillside* plough, made of cast iron in part. It is easily and quickly changed, at the end of each furrow, so as to throw the slice first to the right and then to the left, and always down hill. I have seen plates and descriptions of such ploughs 10 years ago—but it required the sight of the plough itself to prove to me the property of buying and using it—which I shall now certainly do.

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My friend J—— W—— of Goochland, whom I met with in Richmond, told me of the following experiment made by him on summer cowpens. Through the summer, the moveable pens for his cattle were made of equal size, and stood equal times, but varied as follows:

Pen, No. 1. Not ploughed before or after being used for the cattle.

Do. No. 2. Ploughed before using.

Do. No. 3. Ploughed after removing the cattle, and not before.

The next pens, the 4th 5th and 6th, were treated in the same manner and order, and also the succeeding pens, until all were together ploughed for wheat the same autumn. The comparative effects on the wheat were as follows: The tallest and best wheat was on No. 2, and the pens similarly treated—next on No. 1—and the worst considerably, on No. 3.

Another comparison was afterwards made between the plans pursued on No. 2, and No. 3, and it was seen that a pen standing 5 days on the former, produced as good wheat apparently, as ten days on the latter.

W—— informs me that a new practice of applying manure is extending in his neighborhood, and is sanctioned by the approbation and experience of R—— S——, one of the best practical farmers in Virginia. It is to apply all their farmyard and stable manure (in a more or less rotted state) as a thin top dressing to wheat, during the winter. More benefit is supposed to be obtained for grain: and another certain benefit is found in the remarkable improvement to the clover sown about the same time. This practice requires farther inquiry, as it is a very important improvement, if these opinions are well founded. Mr. S—— Col. W—— and others on James River in Goochland make no corn on their highland, which is kept altogether for small grain and clover (as stated in my former memoranda of a visit to those gentlemen) and cultivate in corn only their rich river lowgrounds. This peculiar husbandry may in some degree require their top dressing on wheat.

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April 18th 1834. At B——, Prince George. One of the peculiarities of this extensive and valuable body of land is presented by the numerous basin-shaped depressions, which were ponds before being drained. As they were supplied only by rain water from the adjacent higher lands, and have no springs, their draining was a very simple and easy job. A central ditch leading to some lower land is all that was needed: and such a ditch may be ploughed to the edges, and by turning the furrows outward, leave but little cleaning is to be done by spades and shovels.

Mr. H—— stated that all these former ponds were very rich except their outer part: and this always was a belt of poor soil, from the first draining, greatly inferior to the black loam which formed the central part of the pond, and as much so to the fine brown loam, which forms the general body of the higher grounds. These poor belts must have been continually changing between wet and dry, or naked in dry seasons, and overflowed in wet, when in a state of nature—and the sterility must have been caused by the rapid decomposition of the vegetable matters so exposed.

Mr. H. has a cast iron corn-crusher, which, is fixed in a very simple manner. The lever to which the horses are fixed, (as in a thrashing machine) proceeds directly from the upright shaft or spindle of the crusher—no cog wheel or any other contrivance to give increased velocity. Of course, the crusher can only turn once while the horses walk once around their circle. It crushes, fine enough for food, 40 bushels of ears of corn a day (cob and grain together,) and will grind as much gypsum, after it has been broken to lumps not larger than a man's fist. Examined the ground gypsum. It had been sifted, and the greater part was as fine as meal. The coarser part, did not exceed grains of cockle in size. The machine cost $60, exclusive of the shed and simple horse power, and was worked by two horses.

19th, Charles City county. Mr. M——'s first vessel load of marl, from Coggin's Point, in heaps on his land, presenting a novel spectacle in this part of the country. In riding by, fell in with two of his neighbors to whom I was unknown, and inquired of them concerning Mr. M——'s scheme of obtaining marl by water carriage—and contrary to my expectation, found that he was *not* considered a fool for his pains. His work was highly applauded, and the manure was spoken of as even more valuable than it is in truth. The few loads of marl that have been before carried by water were obtained under all the disadvantages of a

new business, not intended to continue—and of course attended with more than double cost. Mr. M. has gone to work like a man of business, as well as of enterprise—and though he also has his apprenticeship to pay for, I am confident that he will show the expense of water-borne marl to be less than half the previous usual estimate, and his operations will extend its use beyond what any one supposed possible a few years ago. No means yet are furnished for making correct estimates: but I count on the total expense of landing marl 8 to 20 miles from the place at which it is dug, and embarked, being within 2 cents the heaped bushel—including every part of the labor. When this is proved to be true, the use will be extended to every farm on tide water, that has not marl beneath its own surface.

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From the Genesee Farmer.

WHITE RATS.

A year or two since a friend of ours had some pumpkins late in the fall, lying in his barn, and once or twice he observed among them some white animal, which he at first supposed to be a white weasel; but on obtaining a fairer view, saw it was a rat. Driven to its retreat it was found that a pair of them had taken possession of one of the largest pumpkins, in which they had commenced a nest, preparatory to a winter's abode. They were both killed. There was not we believe a dark hair upon them, and though not a pure white, having a slight yellowish tinge, their appearance was on the whole singular. They were evidently *Albinoes*, having the pink eyes so peculiar to that race, whether belonging to man or to the animal. A week or two since we caught in a trap another, possessing the same peculiarities of color, and the Albino conformation. Several years since we shot a squirrel, resembling in size and in every respect one of the common black or gray squirrels, except that he was of a pure and beautiful white, and had the pink eyes so characteristic of the Albino. He was one of the finest looking animals we have ever seen, and there was a feeling of regret, that in order to secure him for a closer inspection it was necessary to kill him. There was not a hair of any other color than pure white upon him, and his large bushy tail, as he frolicked on the ground or playfully leaped about on the trees, gave him a most elegant appearance. Albinoes exist among all races of men; even among the negroes of Africa, Park found one of chalky whiteness; and wherever they exist, the striking peculiarity attending their eyes, serves to render them more observable, and entirely distinct from any other of the same race.

G.

From the Farmers' Series of the Library of Useful Knowledge.

MEADOW.

It has been remarked by the writers on agriculture, that *natural meadows* are no where to be found; because all grass land which is in a state of nature, neither enclosed nor cultivated, is universally pasture. Many centuries probably elapsed before the invention of preserving grass by drying it into a state of hay; and this discovery, which gave rise to what we now term meadow, is supposed to have preceded that of tillage; though this may be considered somewhat doubtful, when we reflect that, in the primitive state of husbandry in this country, the cattle which were intended for consumption during the winter, were slaughtered in the latter end of autumn, and salted for use. To such tracts of ground as consist of maiden earth, some persons are still disposed to limit the extent of meadow land; but, generally speaking, all land that is annually, or even occasionally, mown, is at present known under the denomination. Some considerable tracts of marsh have never yet been submitted to the plough, and much land, which, lying on the banks of rivers, is subject to be occasionally overflowed, is still in a virgin state; but by far the greater part of the upland meadow throughout the kingdom bears evident marks of having been anciently under cultivation.

The general *management of meadow land* lies in a narrow compass—little diversified by practice, except when rendered necessary by difference of season and quality of soil. As the early vegetation of grass is promoted by taking the stock soon off the ground, the uplands are usually "hayned," or laid up at Candlemas; but richer land is often left open until the latter end of March; sometimes, indeed, particularly if the weather be moist, even later:* but, if continued too long, the hay-harvest is proportionably retarded and diminished. On this subject Mr. Sinclair has stated that a given space of the same quality of grass having been cut towards the end of March, and another space of equal size left uncut until the last week in April, the produce of each being afterwards taken at three different cuttings, that of the space last cut exceeded the former in the proportion of three or two; and in one instance during a dry summer, the last cropped space exceeded that which was cropped [first] nearly as two to one.† On land of the latter description, care should also be taken to remove the heavy cattle early in autumn; for such ground being commonly of a loamy nature, and soon softened by a fall of rain, would otherwise be poached, and it is well known that in wet weather the hooves of bullocks form holes which hold water, and thus render the herbage sour.

After the hay has been removed, the meadows are generally shut up for some weeks, until the grass again springs, when the stock are turned upon them in such proportion as they appear able to bear during the autumn; though light store stock are sometimes turned in immediately to crop such spots around the margins, and in the water furrows, as may have escaped the scythe. Other farmers, however, reserve it during winter, and then use it in the manner already stated in the preceding account of fogging. Some, also, who live in the neighborhood of large towns, where they have the advantage of procuring manure,

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* Land of this description has been spring-fed till the 12th of May, and has afterwards—when mown on 24th of June—yielded two tons of hay per acre. Somerset Rep., 3d edition, p. 179.

† Hort. Gram. Woburn.; 3d edit. p. 389.

mow the land a second time some time in the month of August; but in that case they should be earlier than usual in the cutting of the first crop. Cowkeepers, indeed, frequently cut it two or three times in the summer, as they find that rowen hay is of a soft grassy quality, which occasions a greater flush of milk than that which is first mown, though it does not increase its richness, and they, therefore, cut the grass long before the seed has time to ripen. This frequent mowing, however, if it does not exhaust the soil, has a tendency to reduce the herbage:* an injury to which new meadows are more exposed than such as are old; and therefore, land recently laid down to grass, should not be mown, but pastured with sheep, or with very light stock, during the two first years, as the surer method of furnishing it with luxuriant herbage.

After the cattle are removed, the land is *bush-harrowed and rolled.* The bush-harrowing spreads those small portions of mould which are thrown upon the surface by the earth-worms, and are, so far, an excellent dressing, when the operation is properly performed. This, however, is most commonly done by interweaving some strong, but pliant, branches of trees, hedge-row thorns, through the open squares of a heavy harrow, which thus forms an efficient brush, and when drawn over the ground performs its duty perfectly during a short distance; but the branches, being pressed close, and worn by the motion, soon become so flat as not to have the effect of spreading the earth. The better mode is, therefore, to fix the branches upright in a frame placed in the front part of the carriage of the roller; by which means they can be so placed as to sweep the ground effectually, and when worn can be moved a little lower down, so as to continue the work with regularity. In this manner the bush-harrow can also be drawn by a single horse and driven by one man, instead of employing two horses and two drivers, as is the case when the land is rolled and harrowed separately. The object of rolling is merely to lay the land as smooth as possible for the convenience of the mowers, for it is thought by many farmers to retard the progress of vegetation; though there can be little doubt, that if the soil is porous and spongy, the roll will add to its firmness, and give a more substantial bottom to the sward. It has, indeed, been stated, that the operation of heavy rolling has been found to add six or seven hundred weight of hay per acre to the produce of the crop.†

It is also generally thought proper to *destroy the moles* which sometimes burrow in meadow ground, for they raise hills which impede the operation of the scythe, and we shall, therefore, furnish directions for that purpose, under the head of virmin: but it has been lately much doubted whether the mischief which those animals do to pasture land, is not more than counterbalanced—particularly on sheep pasture--by the benefit derived from the top-dressing thus thrown up.

Land that is constantly mown must also be frequently manured, or it will be thrown out of heart. This, however, is very imperfectly attended to by most of those farmers whose holdings consist chiefly of arable land; but grass farmers are well aware that if they do not lay a good coating of rotten dung upon the ground once within three or four years, they will have but a slender crop of hay, even if the after-grass be all pastured. It is, indeed, supposed that a perfectly thick bottom cannot be maintained upon such land, unless it is manured every second year, and therefore many of the farmers in Middlesex covenant to mow only once in each year, and to spread on the land a full coat of stable dung, thoroughly rotten, every third year, and this management has been found to support the soil in good heart.* If the weather proves moist, or inclinable to rain, it is usually laid on immediately after the removal of the hay; but if the season is dry, the operation is then deferred until some time in the autumn, or, more frequently, until early in the spring.

From the Silkworm.

PROFITS OF MULBERRY CULTURE.

A hypothetical calculation appears in the Northampton Courier, of August 3, intended, no doubt, to encourage adventurers in the cultivation of silk, but which, probably, a great majority of those into whose hands it may fall, will pronounce one of those European calculations, which figure on paper but vanish in practice. It is true that many people have been disappointed and some ruined by trusting to calculations on paper, without practice; but should this happen in the present case, it must be owing to bad management or to some misfortune. Facts are certainly stubborn things; and there is not an item in the above calculation but what has been outdone in practice.

The writer proposes to have a poor man hire an acre of sandy soil, suitable for the mulberry; this any honest poor man may easily do: the rent he estimates at $6—this is certainly enough. He is to procure 100 cuttings of the Chinese mulberry at $6 also; this is one dollar above the common price. He calculates that, besides the little corner of his acre which his cuttings will occupy, the remainder will be worth enough to pay the little attendance and that his 100 trees the next season will be worth $25; the lowest current price is now $30 and in great demand.

For the business of the second year he reckons 1000 trees from cuttings at $25 per hundred, and the same number from layers at the same price, and his hundred last year's trees also at $25. The only mistakes in this are, that he should have set his young trees at $30 and those of last year at $40.

At the close of the third year he hypothecates 2100 trees of two years old still at $25 per hundred, and 41000 cuttings and layers—trees—at $25. The first should be $50, and the two others $30: So that he has in these three items for the third year, underrated the truth $2155.

To prove the facts, the following article, from Mr. Ward Cheney, of Manchester, Ct. showing

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* In the Berkshire Report it is, however, said that—"the grass being cut when very young, the land is less exhausted, though frequently cut thrice, than with us, where it remains on the ground before mowing, till a considerable number of the plants have ripened their seeds."—p. 296.

† Derbyshire Report, vol. ii. p. 188.

* Survey of Middlesex, 2nd edition, p. 287.

—not what he can do, but what he has done, and can do again, one might suppose would remove all doubts from the subject.

"To the Editor of the Northampton Courier:

Manchester, Ct. August 8, 1836.

"In reference to an article in your valuable paper of August 3d, in which you inserted a statement of the profit of the culture of the Chinese mulberry, from a small beginning, under the head of "Who would not be a Silk Grower."

To prove that the writer is by no means extravagant in his calculations, I will prove the *actual experiment* I have made this season in Manchester, Connecticut.

On the 12th of May, I set out several thousands of the Morus Multicaulis, of which, I took for experiment 300 trees and set them on ten rods of ground, or one-sixteenth of an acre. Instead of setting the trees perpendicular, they were placed horizontally in the ground, forming a continued row of trees in the following manner: having ploughed a furrow five or six inches deep, I laid the roots and a single stalk in the furrow, so that the end of the stalk should be covered about two inches deep. The rows were three feet apart. From these 300 trees and roots so planted, I now have 3700 fine trees or shoots, which on the 1st day of August would average 2½ feet in height, with large substantial roots of the size of common goose quills.

On the 15th of June I commenced feeding six thousand worms of the six weeks kind, on the foliage of these 3700 shoots, and on the first day of August, the 6000 worms were transformed into three bushels of the finest cocoons I ever saw, (each of which bushels I presume would reel at least 1¼lbs. of silk) worth at least $15. By the 15th of September from the same trees I shall have sufficient foliage to feed 10,000 worms, which would yield three to four bushels more. For the above three hundred trees, I paid 37½ cents each last spring, and estimate their product, 3700, will be worth at least 25 cents each, or $925, and the three bushels of cocoons worth $15, making

	$940 00
Deducting the cost of the three hundred trees, last spring,	112 00
Ditto labor and expense of feeding the worms, and land,	12 00
Leaving a profit on the two hundred trees, for the first year, of	$815 30

Now, if this should be carried out through the second and third year, as was done in the case referred to, I think the result would exceed that of the *silk cabinet*.

From the experience of the last and the present year, I consider that good cuttings on good land will produce at least half a pound of foliage each.

The writer in your last has made allowance for cultivation, feeding of worms, gathering of foliage and other items of deduction, which I do not think is necessary, and instead of the result given for the second and third year being excessive, I must say, that in my opinion, from the experience I have had, and experiments made, the profits might have been greater than there made. I presume the object of the writer was merely to convince the public that the culture of the mulberry and silk might be made a lucrative employment, sufficiently so, to encourage the culture of silk to almost any extent.

I consider it less labor to gather five pounds of foliage from the Chinese or Morus Multicaulis, than to gather one pound from the white mulberry. I have been engaged three years in the culture of the mulberry and manufacture of silk, constantly making experiments, and am fully satisfied that the business may be a profitable one to be pursued in families, as well as by corporations. It is my intention to erect a large cocoonery next fall or spring, upon a new and improved plan of my own invention, about which you may know more hereafter.

At my establishment, about 100,000 of the Chinese, or Multicaulis, are under successful cultivation, and I am so well satisfied with the results of experiments already made, that a similar course will be pursued next year, as the most sure method for propagating the trees, and increasing the quantity of the foliage. I am daily removing the leaves and topping the sprouts, to check the growth of the tree and hasten the product of wood. Some of the sprouts have been cropped of their leaves three or four times without any injury, and every succeeding crop of leaves is improved; although the size may be less, the number and weight have been increased.

From my own experience I am fully convinced, with Mr. Whitmarsh and Dr. Stebbins of Northampton, that the Chinese mulberry ought to be headed down every year, in order to multiply the tree and foliage, and that in this way the tree may be preserved during winter, slightly covering the stumps in the field, and the tops to be used as cuttings the next year. In a large field the stumps may have a light furrow turned over them with a horse plough. The roots left in the ground will be considered as permanent roots. Although it may be necessary or prudent for the plants from seeds, cuttings or layer trees, formed by bending down the side branches, to be removed to the cellar during winter, yet I do not consider that trees cultivated by burying the root and stalk early in the spring will need removal, on account of the early formation of roots, and presume they will make good standards.

WARD CHENEY."

From the Cultivator.

WILSON'S MOWING AND GRAIN CUTTING MACHINE.

Among the thousands of labor saving inventions, which form one of the most prominent features of the present age, it is natural to expect that many splendid and plausible plans may prove abortive, and deceive the inventors, and often the public; and therefore, few men, if any, are capable of deciding with certainty on the merits of an invention, until experience shall sanction the decision.

A machine has been recently exhibited in this city and its vicinity, by the inventor, Capt. Alexander M. Wilson, of Rhinebeck, for mowing grass and cutting grain. I will predicate my remarks on

what I saw, and leave time and experience to decide on its merits.

The machine consists of a carriage on two wheels, propelled by one or two horses, oxen or other beasts of burden, travelling in the rear and pushing it forward. In the front, at the bottom, is a horizontal wheel upon an upright shaft, which shaft and wheel receive a rotary motion, communicated by gear from the main axle, which revolves with its wheels, as the machine goes forward. The diameter of this horizontal wheel, with the addition of the knives projecting from its edge, measures the width of the swath, which is cut with the knives as the wheel goes forward, revolving rapidly and lying close to the ground. The apparatus which sustains the cutting is so constructed as to accommodate its height to any inequalities in the ground, and to give it any inclination required. The knives are sharpened by their own operation, without stopping the machine. There is also attached to the upper side of the cutting wheel a rim which gathers the grass as it is cut, and lays it in a swath more regularly than it can be laid by the scythe.

I saw it in operation, propelled by two horses, and cutting a swath about six feet wide, as fast as the horse could walk; and though the ground was very uneven, and the grass somewhat dry and in bad order, it performed the work as well as it could be done by hand.

I know not what objections experience may raise against it, but I would venture to say, if this most tedious and yet most important labor of the husbandman, is ever to be successfully performed by machinery, I think this machine more likely to effect it than any other plan I have seen. It would be absurd to expect this or any other mowing machine, to operate on new and rough land, among stones and stumps—but our country affords numerous large tracts of meadow with fine smooth bottom, and the proportion is rapidly increasing; and in the great western prairies, such a machine cannot fail to be one of the most useful improvements of the age. I would therefore advise every agriculturist who has smooth meadows, or which can be made smooth, particularly those at the far west, to see this machine, and endeavor to promote its introduction, so far at least as to give it a fair trial.

S. BLYDENBURGH.

Reference made to the patentee, Rhinebeck, Dutchess Co., or to George Hanford, No. 409 South Market-street, Albany.

Extract from the Cultivator.

THE CUT WORM.

The cut worms are evidently the numerous progeny of some familiar insect. The question arises, to what species can they be attributed? Some are led to conjecture, that these are propagated by the order *Coleoptera*, or beetle: although I have examined, with some care, the several species of the beetle tribe common in this country, among which the pellet beetle is most numerous, yet I have invariably found their larvæ of pale yellowish, or light brown color; whereas the cut worm is nearly black, and very different in its habits. The conjecture that the cut worms are the larvæ of the beetle, or any other perpetual insect, should be humbled by the single circumstance, that the cut worm is periodical in its devastating visitations, and consequently can be the progeny *only* of a periodical insect. I know none of that character bearing a semblance of suspicion, excepting the *cicada septemdecem*, of the order *hemiptera*, genus *cicada*, and species *grilli* or *grillus* of Linn. (here very improperly mis-termed locust, for those visiting Europe and Africa, whose history present a series of calamities, inspiring all people with superstitious horror.) The American cicada is remarkable for its regular and simultaneous reappearance every seventeen years, in countless millions. They appeared here in 1817 and 1834, several years succeeding each of those dates, have been marked, by the destruction of the cut worm. And as some of the cicada appear every year, we also find *some* however *few*, of the cut worm every year. It is ascertained, that the cicada deposite each from 600 to 1,000 eggs, forming of course a numerous progeny.

This conjecture of mine, relative to the cut worm, although strengthened by observation and experience, yet should any of your observing and enlightened correspondence offer an idea more plausible, the above shall be freely yielded notwithstanding.

Many practical farmers have prescribed remedies to counteract the ravages of the cut worm, stating the consummate success of their *modus operandi;* but it is matter of reget to know, that an effectual remedy is still wanting, to expel or dislodge them when once in possession of the corn hill. There are, however, preventives, well worthy the farmer's attention. The most effectual prevention consists in ploughing sward ground intended for corn in autumn, previous to planting; but if this be not convenient, a stubble field should be chosen, if ploughed in the spring; the rationale or philosophy of the mode is simply this, the sod being turned up to the frost of winter, it becomes so meliorated and consolidated by spring, (if well ploughed) that there will be no green thing scarcely of vegetable kind left for the larvæ of the insect to subsist upon, and consequently they either desert the field or perish. The same parity of reasoning holds good for stubble ground, it being also destitute of food, and thus affording the grub no harbor. Another method, by means of which I have entirely succeeded the present season, notwithstanding the adjacent field of a neighbor was wholly destroyed, it may not be amiss to notice. The field was an old sod of timothy and clover. Apprehending the danger of the cut worm, I delayed ploughing until after the 1st of May, to give the grass a start, which grew strong, and was ploughed under, designing it as food for the cut worms; my expectations were realized, the corn was scarcely touched by the worms, and the green grass, consisting almost wholly of *soluble matter*, from present appearances, will be no detriment to the corn crop, but *vice versa*.

From the London Farmers' Magazine.

COMPARATIVE TABLE OF SPEED.

From the Physical and Chemical Journal of Science, and the Arts of Husbandry in France,

we make the following extract, which will be found no less curious than useful, and cannot fail to interest our readers:

	Feet per second.
The ordinary rate of a man walking, -	4
Of a good horse in harness, - -	12
(Or 2,000 toises (yards) in minutes.)	
Of a reindeer in a sledge, on the ice,	26
Of an English race-horse, - -	43
Of a hare, - - - - -	88
Of a man casting a stone with all his force, - - - - -	60*
Of a good sailing ship, - - -	19
Of the wind, - - - - -	82
Of sound, - - - - -	1,038
Of a cannon-shot (24-pounder) -	1,300
Of the air which returns into space so divided, - - - - -	1,300

From the London Mechanics Magazine.

SOAP FROM FLINTS.

Mr. Sheridan takes the common black-flint, calcined, and reduces it to powder by wet-grinding; then mixes it with the caustic soda leys, or potash leys, and boils it till it attains saponification. The mixture so obtained† is added to the present soap materials after the latter have been boiled to that state when they have become soap, and are ready to be poured into the frames. The mixture, which has a high detergent quality, requires to be well crutched along with the soap materials; and when thus crutched together, the result is a soap of excellent quality. The mixture becomes intimately incorporated with the soap materials, and may be added in proportion of from 40 to 50 parts of the mixture to 50 of the soap materials. Thus the common silex, which is obtainable at a very low price, takes the place of tallow to the extent nearly one-half.

From the Rail Road Journal.

MANUFACTURE OF COKE.

Extract from Professor Renwick's *Application of Chemistry to the Useful Arts.*

Coke bears the same relation to bituminous coal, which charcoal does to wood, and is, like it, obtained by distillation at a red heat. Bituminous coal is a compound of carbon, hydrogen, and oxygen, in very various proportions. In the variety called cannel coal, the proportion of hydrogen amounts to 5½ per cent. In the Liverpool coal it is about 3¼ per cent.; and in the slaty varieties does not exceed one per cent. The quantity of carbon varies from 75 per cent. in cannel coal, to 90 per cent. in that of Newcastle. The proportion of oxygen in cannel coal is about twice as great as would suffice to convert the hydrogen into water; in the Newcastle coal about four times as great; and in the slaty varieties, it but little exceeds the proper relation.

Coals may be divided into three varieties:

1. Those which contain at least three per cent. of hydrogen, and, at most, as much oxygen as will convert half the hydrogen into water.

2. Coals which contain oxygen in such quantity as to convert two-thirds of the hydrogen into water.

3. Coals which contain oxygen enough to convert the whole of the hydrogen into water.

The first of these varieties fuses when heated, and the excess of hydrogen uniting with a part of the carbon, escapes in the gaseous form; by the formation and escape of gas, the coke is rendered light and porous. The second variety fuses also, but the quantity of gas formed is not sufficient to render the coke porous; it is therefore compact and massive.

The third variety does not fuse, and the escape of the vapor of water reduces the mass to the form of powder.

Coal of the first class increases in volume when it is coked; the other two varieties yield coke in less volume than the coal employed. In their uses in the arts, the first furnishes the most valuable coke; the last that of least value.

Coke may be prepared in iron cylinders or retorts, but this is only done when the volatile products are to be collected; this method will therefore be described when we treat of the preparation of gas for illumination. Treated in this way, cannel coal yields about fifty per cent. of coke, and that of Newcastle as much as eighty per cent.

When the distillation is performed at a low temperature, the weight of coke is increased, but its volume and porosity are diminished. It is therefore advantageous, when the volatile matters are not the principal object, to effect the decomposition of the coal by a sudden and high heat.

Preparation.—When coal is rich in hydrogen, it may be readily coked in heaps resembling the *pits* used in preparing charcoal. The coal must be in pieces having not less than three or four inches in each dimension. The heaps are conical, having a base fifteen feet in diameter, and a height of about thirty inches. The heap may be best covered with straw, on which is laid a layer of moist earth, the straw being so applied that the earth cannot enter into the spaces between the pieces of coal. But as the use of straw is expensive, it is more usual to cover the large coal for about the height of a foot from the ground with smaller pieces, and the outside with coal-dust; the top of the heap is covered with the refuse coke which is left in the form of powder, in handling that obtained in previous operations. The heap being finished, a few lighted coals are dropped into an opening of six or eight inches in depth left in the top; the space is then filled up with fragments of coal, and when the combustion has fairly commenced, the whole is covered with earth or refuse coke. The rest of the process is much the same as that of preparing charcoal, but is easier, as coal when in mass will not continue to burn al-

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* We believe this calculation to be incorrect. A stone cast with strength of a man's arm would outstrip a hare.

† The compound here alluded to is a combination of silica (silex) and potassa (potash,) and is frequently called liquor of flints. Silica is a body still generally ranked with the *earths*, which it resembles in many points, but it is, in its chemical relations, an *acid*, combinining with alkalis, and forming salts, which are called silicates. It may be considered a curious fact, if the above statement be correct, that this weak mineral acid should be able to take the place of the weak animal or vegetable acids united with alkalis in ordinary soaps.

tre the gaseous matter has escaped, unless new surfaces be exposed to air.

In heaps of greater diameter and height than we have described, the combustion would be too slow at first to form a porous coke, and so rapid at the end as to render it difficult to extinguish. Yet so large is the quantity of coke which is required in some instances, and particularly in the manufacture of iron, that heaps of so small a size would be attended with inconvenience. The shape of the heap is therefore changed in such case from a cone to a long prism. The breadth of this must not exceed fifteen feet, nor its height three feet, but its length may be unlimited. This prism must be set on fire in the mode we have mentioned at several points on its upper edge. In this way not only may a greater quantity of coke be prepared at a single operation, but the time is shortened, the conical heaps requiring three or four days for their conversion into coke, while the prisms are finished in twenty-four hours.

The product is usually about forty per cent., but some coals, that of Virginia for instance, yield fifty per cent. If a coal, in consequence of its containing but little hydrogen, does not burn freely, it cannot be converted into coke in this way. Such a coal was found in Yorkshire, (England,) in association with minerals which would render the manufacture of iron profitable. In order to apply it to this purpose, an intelligent manufacturer (Wilkinson) imagined the application of a chimney, for the purpose of obtaining a more powerful draught. This chimney is conical in form, about a yard in height, and as much in diameter at bottom; the diameter at top is two feet; it is built of brick, the lower courses of which are laid in such manner as to leave openings. Around the chimney the coal is piled in a heap, whose radius is about six feet greater than the outer radius of the chimney. This heap is composed of alternate layers of large and small coal, the lowermost layer being of pieces of the largest size. The surface of the heap is covered with ashes or refuse coke, and fire is applied by throwing burning fuel into the chimney. Wet ashes are kept on hand to close any cracks which may occur in the cover of the heap. Dense smoke flows from the chimney, and is followed by a blue flame; as soon as this appears, the top of the chimney must be closed by a plate of cast iron and the combustion will speedily cease.

The coal of Pittsburg, Pa. as far as we can learn, must resemble in quality the coal employed by Wilkinson; for although far removed in character from anthracite, it has not hitherto been converted into coke by the use of the mode first described. We cannot but express our belief that the method of Wilkinson would be found sufficient for the purpose, and that by its aid the manufacture of iron from the ores might be introduced into that city, which at present receives almost all the pig iron used in its extensive foundries and forges, from the opposite side of the Alleghany range of mountains.

This method has also been introduced, with some modifications in Staffordshire, where the coal is of better quality. Here the coarser coal is placed in contact with the chimney, and the finer at the outside of the heap, the whole being covered with ashes, or refuse coke, leaving a few openings for the admission of air. As soon as the coke is finished, water is poured on the heap to extinguish the combustion. In this way the product of coke is raised from forty to fifty per cent.

All the methods of which we have spoken require that the coal should be principally of that size which is of most value for other purposes, namely, in coarse fragments. Much however of all good coal is reduced to dust in its extraction from the mines, and in the handling it must undergo. This, in most parts of England, is totally lost, and it has even been necessary to burn it in heaps in order to get rid of it. In France, where coal is more scarce, and consequently of more value, it has become an important object, that none but such refuse coal should be converted into coke, and the coarser pieces left to be employed for other purposes. This object has been successfully accomplished in the neighborhood of St. Etienne.

The heap in which the coal is burnt may have the form either of a truncated cone, or oblong truncated pyramid. The latter form is most easily constructed, and described. A case of plank is formed, having the desired figure, say a base of fifty or sixty feet in length by four feet in breadth, a height of $3\frac{1}{2}$ feet; and the planks are so inclined as to make the dimensions of the upper surface two feet less in each direction than that of the base.

The planks which form the ends of the case are each pierced with four holes: one at the base, one directly over it and near the top, the other two at half the height of the plank, and in the vertical plane of the upper edge of the sides. Each side is also pierced with three ranges of holes, having the same arrangement in quincunx as those of the ends, and at the same distances.

These holes serve for the introduction of tapering spars. The spars of the lowermost layer are passed through the holes in the sides and ends, at right angles to the respective direction of these surfaces, and at the angles where the spars meet each other, vertical spars are set up. The second range of spars is inclined to the sides in such manner as to meet the vertical spars; and the third layer has the same direction as the first.

The fine coal is prepared by mixing it into a paste with water, by means of a hoe. It is then thrown into the case, and well rammed upon the lower range of spars, until a bed has been formed to receive the second range of spars. This latter range being placed, more coal is thrown in and rammed, until the height of the third range of spars has been reached, and this being introduced, the rest of the case is filled in the same manner.

In order to lessen the expense of the wood employed, the heap may be built in successive portions, each ten or twelve feet in length, and when one portion has been finished, the planks and spars are removed to enclose and form passages in a second portion. The spars form conical passages in the mass, by which air may be admitted during the combustion. When the heap has thus been completed and covered with ashes and refuse coke, all the wood is removed, and the heap is set on fire by igniting small heaps of coarse coal upon each of the openings left in the upper surface by withdrawing the vertical spars. It has been found that in pyramidal heaps, about $\frac{1}{20}$ part of the coal to be coked is required for this purpose; but in small conical heaps, where a single vertical spar will suffice no more than $\frac{1}{50}$ will be used.

The attention of the workmen must be directed not only to close the cracks which may appear in the cover, but to keep the passages left by the spars open by means of iron rods. The completion of the process is known by the cessation of the flame. Water is then introduced into the lower passages, whose steam in passing through the incadescent heap is decomposed, and furnishes hydrogen which escapes in flame. The heap is then covered closely with earth, and left until it cools.

In this way coal which would otherwise be lost, yields fifty per cent. of coke of excellent quality.

When coal of the first variety (with the exception of cannel coal) is distilled in close vessels, it yields from seventy to eighty per cent. of coke, by the combustion of about ten per cent. of coal. As the best of the methods we have yet described yields no more than fifty per cent., and the most common of them no more than forty, there is obviously a very great waste. In the neighborhood of coal mines this is more than compensated by the simplicity and facility of this process. But at a distance from mines a more economical process is necessary, unless coke can be transported from this vicinity, which is by no means easy, in consequence of its friable character, and its being liable to injury by being wet. The best apparatus for this purpose is called the coking oven. This is formed of a cylindrical wall about two feet in height surmounted by a dome, from the summit of which rises a chimney about eighteen inches by twelve inches, having an iron shutter. The coal is introduced through the chimney, and spread by a rake over the floor, to an uniform depth of about four inches. Burning coals are then dropped through the chimney, and as soon as the ignition is fairly commenced the door is closed. When a blue flame begins to appear at the chimney, the top of it is closed by a plate of iron. In this method about one-half more coke is obtained than by the ordinary heaps.

Large spheroidal kilns, and reverberatory furnaces have also been used, but their principal object was the preparation of the coal tar. As this article has not proved to be of any great value, and is besides produced at gas-works in quantities greater than can be consumed, it is unnecessary to describe these kilns and furnaces.

It may be here mentioned that turf or peat may be carbonized as well as coal or wood. The fuel thus produced is of very excellent quality, and may be applied to the same purposes as that obtained from wood or bituminous coal. Pits, as used in preparing charcoal, have not been found well adapted to the preparation of the charcoal of turf. The little that has been made of good quality was prepared in iron cylinders, but as this is too expensive for manufacturing purposes, it appears probable that if it should ever be necessary to carbonate turf on a large scale it will be done in kilns like those described under the head of charcoal.

AGRICULTURAL CONVENTION.

To the Editor of the Farmers' Register.

October 15*th*, 1836.

Shall we or shall we not have another convention? If we shall, when will be the best time of meet? How can a sufficient interest be excited to secure a numerous assemblage of agriculturists? Which course will be best to pursue—the heretofore utterly vain and self-degrading begging a wilfully deaf legislature to do something for our fast declining agriculture—or, zealously and actively to exert ourselves, independently of legislative aid, for its resuscitation?

These questions are propounded, at present, in the earnest hope of eliciting, both from yourself and other good friends to the great cause of agricultural improvement, such opinions and suggestions as may, and, I trust, will rouse all the planters and farmers of our state from their long and deadly lethargy, to a just sense of their present condition; and to a unanimous determination no longer to neglect the means, still in their power, of arresting the general abandonment of our native homes, for strange and far distant lands.

Having taken the liberty to lead the way in asking the questions, I will also suggest a few such answers, as I hope will be satisfactory, together with some brief arguments in their favor, by way of inducing others, much better qualified than myself, to aid in exciting all the true friends and real lovers of our good old mother Virginia, to exert themselves publicly, and with effectual activity to save her from the desolation and ruin with which she is so seriously threatened, by the abandonment of her soil and the desertion of her children in her hour of need.

To the first question I answer, aye! a response which I most earnestly hope will be re-echoed from every quarter of our state. My argument for it is, that as all agree in the necessity of *doing something*, there is no better way than to hold a convention of the friends of agriculture, to ascertain first what is best to be done, and then to devise the ways and means of doing it, instead of trusting it to others, who, even if they know how, have never manifested the slightest inclination to do any thing in our behalf. The best time to meet, I should suggest, is in ten days or a fortnight after the meeting of the legislature; before the usual party quarrels and battles get fairly, (I ought rather to say, *foully*,) under way; for after *that*, all matters of internal policy and state-interest are left, generally, to take care of themselves. I name not this period from any expectation or wish, that the convention should ever again apply to a Virginia legislature—constituted as it now is of agriculturists in *name only*, and not in *principle*—for any aid whatever; but because some members of the latter, might also be members of the former, and would have more leisure, and possibly more inclination to attend, before their minds and tempers get bedevilled and distracted with their party conflicts; and in humble imitation of the highest authority in our country, I name the second Monday in December for the meeting. If you also name it, in your Register, I am very confident that it will be generally approved as most convenient. Another reason is, that peradventure, the convention might resolve on something which would make it necessary to require at the hands of their honors, at least a naked act of incorporation to carry it into effect; and a first application in such cases, has always some advantage, provided it be in regard to some matter which cannot, by any possibility, be turned or twisted into a party-question: for if it can, fare-

well to justice—farewell to truth—farewell to all the great interests of the state, should they seem to conflict with the interests of party. This has been more or less true of all the parties I have ever known or read of; and therefore, I hope you will not exclude the remark from your Register, as contraband.

As to the third question—"how can a sufficient interest be excited to secure a numerous assemblage" at the proposed convention? I fear that it is much more easily asked than answered. But having *committed myself* to reply, I must take, in making the attempt, the old shooting-match rule, "stick or go through." Here goes then, at a venture. I would suggest, that you yourself, Mr. Editor, and a few more such good friends of the cause, should earnestly invite, through the columns of your paper, every true agricultural son, both native-born and adopted, of the Ancient Dominion, to attend this convention, either in person or by proxy. The latter might certainly be done by all, for one man might represent a county or district. I would farther suggest that the members of this convention should come prepared, *not to separate* until something definitive, and bidding fair to succeed, should be determined on. Such determination might be much facilitated, if you and your correspondents would avail yourselves of the numbers of your Register which will come out before the meeting, to propose and recommend all such plans as you may deem best to effect our objects; and especially such as could be effected without troubling our *mis*-representatives either with our wants or wishes—than which, nothing I think, would be more futile or humiliating. Moreover, it would be an act of extreme folly on the part of the convention: for if we sons of the soil, and livers by it, *will* so far forget our own best interests, as to choose our law-makers solely for their real and imputed prowess in fighting political party-battles, we have no imaginable right to expect them, either to know or to care for any thing else. "*Occupet extremum scabies*,"—"the devil take the hindmost"—is both the law and the gospel of all party-men, however imposing and specious their self-assumed titles may be—and as agriculture *must necessarily be hindmost*, where the victories of political party are the only objects aimed at, or cared for, by the law-makers of the land, the agriculturists who knowingly and wilfully elect such men to represent them, deserve the worst that can happen to them. They, the electors who act thus, are in fact, much better subjects for a lunatic hospital, and a strait waistcoat, than agents to exercise the elective franchise for the general welfare. *The general welfare!* God save the mark! It is the despicable lip-service of the unprincipled demagogue, at the same time that it is the heart-felt, the constant rule and guide of the true patriot, under all real and imaginable obstacles; and the facility with which the former, the most despicable animal in all God's creation, can impose himself on a credulous and confiding public, for the latter, the noblest of God's creatures, is one of the most disastrous, the most deadly evils to which our free institutions are exposed. This blot, this stigma, this foul cancer on our body politic might forever be extirpated, if the sound sense, sound principle, sound patriotism, (of all which, thank God, we still have a goodly stock in our dear old state,) would only make common cause of it, and forever discard both from their service and confidence, every human being, from a president of the United States to a scavenger in the streets and sewers of a town, (or, if there is any lower office, even from that,) the individuals who would sacrifice the general welfare—the national good, to party-interests. Pardon me, Mr. Editor, if my zeal for agricultural improvement, which I most conscientiously believe to be the life-blood of national welfare, has led me a little out of the track which I had determined, in the beginning of my letter, to pursue. You may castigate me as much as you please, in your Register, if you will only permit me to speak for myself, "*verbatim et literatim*," as I have addressed you. If any of your readers should be disposed to censure what I have said, pray turn them over to me, and if I do not justify every word and sentence of this communication, let the sin and the punishment be inflicted, not on *you*, but on myself; for *I* can testify, (on oath, if necessary,) that your editorial privilege of excluding altogether, or "*expunging*," when requested, as in my case heretofore, every thing which you deemed objectionable, has been exercised with the strictest and most conscientious scrupulosity. That you *have been*, in a few, *very few instances*, somewhat too fastidious, according to my notions, I avail myself of this opportunity to tell you; but I must say, that, "*take you for all in all*," there is no man on whose taste, and judgment and principles, I have more reliance as to all matters to which you have directed your particular attention. This is no compliment, my good sir—but the unvarnished truth, and here stated to prove, as far as one witness can do it, that in your editoral character, you extend neither partiality nor favor, even to your best friends.

But let me return to my suggestions as to the means of exerting sufficient interest among our agriculturists, to insure a numerously attended convention. In addition to those already stated, let the Register and its most active correspondents unite in summoning the agriculturists of Virginia, to "hasten to the rescue." As a class, we are in extreme jeopardy; and it is only by a very general and vigorous co-operation, that we can emerge from our present most forlorn and portentous condition. Virginia land-owners and cultivators must, aye, *inevitably must* "give up the ship," (to borrow a phrase from our nautical brethren,) or sink with her, unless they will unanimously resolve to do what is indispensable to keep her from foundering, in a sea wherein no true gallant seamen would ever desert her. This course of action is, to require, in every case, of those for whom we vote to represent us, that they shall never fail to promote the interests of agriculture, by every fair means in their power; and that they should never again show their faces among us, as candidates for re-election, without sufficient evidence that they *have* thus exerted themselves. Our constant failure to require, nay, to demand such evidence, is one of the principal, if not the chief cause of the present depression of Virginia agriculture; and in a moral point of view, is little, if any better, than committing political suicide. "Clod-hoppers" we are by name, and the proofs that we are so, in reality, are stronger than I am able to encounter. Nay, we have been sarcastically, and I fear justly, compared to *sheep*, ready to be sheared, without resistance, by all who know the value

of our fleeces better than we ourselves do; and the comparison will be perfectly just, until we learn to claim, as *our right*, that rank in the scale of national value, importance, and respectability, to which we are justly entitled. Never, *no never until then*, can we expect to be used or treated by our governments, either state or federal, as any thing better than insensate tools or instruments to work with, in promoting their respective political party purposes. *Will you*, my friends and brethren, lend yourselves to any such base, self-degrading, unpatriotic course? Will you not rather assert your rights, and take the only steps necessary to secure, not only *their* recognition, but active and persevering efforts to cherish and promote them. Those steps are to elect agriculturists, both in profession and legislative practice, to represent you. In other words, to elect men who will, *at all times and under all circumstances*, deem it their primary duty to promote Virginia agriculture as the chief element—the cardinal principle—the only true basis of Virginia welfare and relative importance in the union of the states. *Neglect this duty to ourselves*, (I may add to the whole American people,) and we may be hugged and kissed to our hearts' content, so long as we will consent to be used as passive tools for party purposes; but we may certainly count on being utterly forgotten, and trampled upon afterwards, until wanted again. *Neglect this*, and we may whistle or sing, (as the fit prompts us,) an eternal requiem to our professional claims, our rights, and our just standing in the community. It is strange, most passing strange, that the agriculturists of Virginia, who indisputably constitute, *at present*, by far the most numerous class in our community, should still be so blind, or so wilfully regardless, both of their own importance, and of the extent of their power if they would only exercise it as they so easily and justly might do, for their own and the general good. It is yet more strange, that all the other classes, although far less numerous, should constantly act with so much stronger, more efficient, and more sagacious regard to their own particular interests: thus palpably contradicting the common adage, that the majority always rules. I *must* believe, until our national statistics convince me to the contrary, that *the landed interest of Virginia* constitute an immense majority of our whole population; and upon the principle just stated, *that interest* ought to rule our national councils. But woful experience testifies to the contrary; and furnishes ample evidence to prove, that every *other* interest has the advantage in the great and continual contest for legislative preference. *Why it is*, or *should be so* I must leave to more competent judges than myself to decide. But the fact is no longer doubtful; for as far back as I can recollect any thing of Virginia legislation, it has been utterly negligent of the great agricultural interests of the state, if not hostile to them, at the same time that a very large majority of our legislators have always been owners, or cultivators, or both, of the landed property of the state. It has been vulgarly said, that "it is an ill bird which fouls its own nest;" but I *may* add, that it is a far worse bird which causes its own offspring to perish, either from neglect or wilful mismanagement; yet *such a bird* most aptly represents our class. Shall this, my brethren, *always be true*, in regard to us agriculturists? Shall we be forever justly liable to the charge of greater ignorance or greater negligence of our own interests, than any other class in the community? Or shall we not rather manifest our real strength and exert our full legitimate power in directing and controlling our state legislation, for the general good? This question we must speedily decide, and act upon such decision with all our numerical and moral force, or patiently submit to be "*hewers of wood and drawers of water*" for the remainder of our self-degrading and most humiliating existence. Our only escape from such debasement seems to me, most indisputably to depend upon our unanimous, constant, untiring co-operation as a class; in other words, upon our making it a rule for ourselves—never to be departed from, that in electing men to represent us in a legislative capacity, we should make devotion to the agricultural interest the next most important prerequisite to moral honesty. Another rule should be, to encourage more frequent meetings in bodies as numerous as could conveniently be collected; call them what you please—agricultural societies, conventions, or any thing else, provided always, that *mutual concert for mutual good*, which must necessarily include public good, be invariably the object of all their consultations and measures. If such a course were steadily pursued, only for one year, I verily believe that death itself is not more certain, than would be some legislation in our favor, as well as a very general improvement in the whole husbandry. Let us meet then, in convention, on the second Monday in December, (if you will only divide with me the responsibility of naming that day,) and make at least one more effort—*not to petition the legislature*, for they have no ears for us or our affairs, if we may judge of the future by the past; but to ascertain how far it is possible to exert ourselves in our own behalf. Should we make nothing but "a water-haul," (as the fishermen say,) we shall at least be better satisfied than we can be at present: and *that alone* is a boon well worth purchasing at such an expense as the meeting would cost us.

Now, and at all times your friend,

COMMENTATOR.

We unite heartily with our correspondent in desiring to call attention to the Agricultural Convention, and to induce the fullest possible attendance, in the manner pointed out in one of the resolutions of the former convention, which we shall republish below. As to the views of our correspondent in regard to the procedure, or the best means of effecting the great object that every member and every individual will seek—the improvement of agricultural practice and promotion of agricultural interests—we shall now express no opinion: but invite all to the discussion, in the hope that the stirring of the question in this manner may cause many to think maturely on the subject, and lead to a well digested, combined and successful effort.

In one minor matter, we differ from our correspondent, and must therefore withhold the concurrent action which he requests. The former Convention fixed what was then thought the most suitable time for the next meeting—and whether it was so or not, its being so fixed, would make an attempt at alteration inexpedient, and probably injurious. Independent of this con-

sideration, we still believe that the time fixed by the former convention for the meeting of the next, is on the whole the best.

Extract from the minutes of proceedings of the Agricultural Convention, Jan. 13, 1836.

"RESOLVED, That it is recommended by this body, that an Agricultural Convention shall again meet in the City of Richmond, on the second Monday in January, 1837, to be composed of delegates from the several Agricultural Societies in Virginia, and from any public meetings of members of the agricultural interest, in counties and towns where no such societies have been organized."

Communicated for Publication in the Farmers' Register.

REPORT OF THOMAS BLANCHARD, ESQ. ON THE UPPER ROANOKE NAVIGATION, IN REGARD TO THE USE OF STEAMBOATS.

To A. Joyner, Esq.

Agreeably to your instruction, I have examined the Roanoke River from Rock Landing, at the entrance of the canal, to Clarksville, in Virginia, for the purpose of ascertaining the practicability of navigating the said river between those points, by steamboats, and beg leave to submit the following remarks.

The present sluices, or most of them, are altogether inadequate for steamboat navigation; and in some places the fall of water is too great, to be overcome without locking. I have therefore made such remarks as I thought necessary, on the falls and shoals as I passed along, taking the names of the different places as given me by the boatmen: but the distances between the obstructions, I could not accurately get, and have omitted them altogether.

The first rapid shoal that came under my notice, is called the Old House Ledge. It is a rapid of about 30 rods long—the fall of water in the distance about two feet, and the water in the sluice, about two feet and a half deep. This shoal can be made navigable for steamboats, by deepening the sluice at the head, and giving it a more gradual fall, or inclined plane.

2nd. Eaton's Falls. The fall at this place is about ten feet, and is overcome by a short canal and lock. The latter will admit the passage of boats of only seventy feet long. The entrance to the lock requires straightening, and to be made deeper: the canal will require to be made straight, and some wider.

3d. Allen's Falls. The first rapid was about two feet fall in a short distance—was found to have two and a half feet water in the sluice, and must be improved. The second rapid, in the same falls, is much the same as the first, and can be sufficiently improved by sluicing.

4th. Hamlin's Shoals. The first bar is along side of an island—the rapid is short, and water very strong. The second bar is a ledge of rocks, extending the whole width of the river—the water in the sluice two feet deep, the fall two and a half, in fifteen or twenty rods. The third rapid is in all respects much like the second; the head of which, is the foot of the fourth sluice, which has a stone wall, and is shoal and rapid. The fifth sluice terminates these rapids. They are about two miles long, and form a continued succession of shoals the whole distance—the bed of the river being wide, the bottom composed of solid rock, and the fall more than sixteen feet. To make these shoals navigable for steamboats, locks are necessary. To improve them by sluicing, would require one regular inclined plane over the whole of them, making a fall of water of about ten feet to the mile, which is as great a fall as can be overcome to advantage.

5th. Ballard's Shoals. These shoals are three-fourths of a mile long, and about four feet fall in two short rapids—the sluices of which are crooked and shoal. They can be improved by extending the sluices with side walls, and using dams and making them deeper.

6th. Pugh's Falls are about three-quarters of a mile long, having a fall of six feet. Here are the ruins of an old lock, which it will be necessary to re-construct, or build a new one. A short distance above this place, on the south side of Cotton Island, is a short rapid of about two feet fall, breaking over a ledge of rock, extending from the island to the opposite shore. The water is deep both above and below, and nothing more is wanting but to cut a sluice through the ledge.

7th. Lizard Creek. There are two rapids at this place, about one-fourth of a mile long. The first has a fall of about three feet in twenty rods—the second is not so strong, but both will require improving by locks or long sluices.

8th. Collar Bone Falls. At this point the water falls about two feet in thirty rods, and can be sufficiently improved by deepening the channel at the head of the sluice, and making a wall up the side of the north shore, thus forming a long sluice.

9th. Black Shoals. The fall here is about eighteen inches, in two short rapids, and can be easily improved by cutting sluices.

10th. Horseford Falls. The whole extent of these falls, is nearly two miles, but the greater part of the fall is in a distance of three-quarters of a mile, having a fall of about six feet, the whole fall being eight feet. The main fall is over a stratum of rocks the whole width of the river. One lock of about six feet lift would be sufficient for these falls.

11th. Short's Falls are one mile long, and can be improved by sluicing.

12th. Bug's Island Shoals, require to be made deeper and straight.

13th. Butcher's Creek Shoals. These falls are too rapid to be overcome without lockage—the most difficult place is around Eagle Point, where a wall has been constructed. The sluice is crooked. A dam of five feet lift would raise the water sufficiently for the two first rapids; the others can be improved by removing rocks, and making the sluices straight.

14th. Johnson's Sluice Shoals, are more than a mile long; the sluices are too narrow and crooked; the turn too short around the island. The sluices must be made wider and longer.

15th. Clarksville Falls. At this point there is a fall of about three feet. The sluice through the milldam is too short and rapid for steamboats. As here is a good mill seat, a dam and lock would be necessary for steamboats, and supplying water for a mill.

The examination I have been able to make of

Roanoke River between the points already indicated, (Rock Landing and Clarksville,) induces me to believe that five locks at least are necessary, and there are not less than twenty-five shoal places where the water falls from one to three feet in short rapids requiring improvement. Sluices have been formed through these falls or rapids for batteau navigation, but they are generally too crooked and narrow for steam boat navigation. In addition to this, between the ponds formed by the several falls, there are many secret or hidden rocks near the surface in low water, which would be destructive to steam boats, and must be removed. The sluices at places where this mode of improvement is adopted, must be so extended as to give the water a gradual fall of not more than at the rate of ten feet to the mile. This rate of inclination may be considered the maximum fall that a steamboat will overcome, taking other boats in tow. The sluices should be three feet deep, and not less than thirty feet wide to navigate them with safety. The kind of boat I would recommend for the river is 85 feet long, and 13½ feet wide, with the wheel in the stern: such a boat, if built with my patent arches, would not draw more than 18 inches water.

As to the cost of making the necessary improvements on Roanoke River, for steam navigation, it would be impossible for me to form any correct estimate, having no adequate data upon which to found such estimate for work in this part of the country.

THOS. BLANCHARD.

MUD WALLS DEFENDED.

To the Editor of the Farmers' Register.

Richmond, (Va.) Oct. 23, 1836.

An absence from home during the past summer has prevented my reading, of late, your interesting journal as usual, and it is but a day or two since accident threw in my way, the September No. of the Register, in which I noticed, for the first time, Mr. Herbemont's reply to my remarks upon Mud Walls.

Mr. H. sets out by accusing *me*, (such pretensions are never wanting to a warlike enemy,) of "waging war" against him, and veteran as he is—always ready—he takes advantage, anticipates the offensive, and opens his batteries upon me, with the most merciless discharge of irony and satire. Now although my adversary has resorted so unprovokedly to the "*ultimo ratio*", and thus placed matters between us, according to all rule, beyond the pale of treaty, I have still too much respect for the adage at which he hints, to answer him in his own way, unless his temerity shall force the necessity upon me. I even implore a *truce*, and shall endeavor in the mean time to *confirm* peace by assuring Mr. H. that I intended no "attack" or "irony" by my remarks, and that in speaking of him, and his article upon *Pisé*, I really *intended* to do so with the utmost respect and courtesy—and if indeed I have done otherwise, it is purely attributable to my awkwardness, for I utterly disclaim any "*malice prepense*" in the whole matter.

Having thus made the honorable amend, I cannot help remarking, Mr. Editor, how discouraging it is, to say the least of it, to have one's *maiden essay* so unmercifully assailed, especially by such a *veteran* of the pen as my adversary. "*Est modus in rebus*"—but verily, Mr. Herbemont has forgotten this maxim of moderation, in his attack upon me, and what he is pleased to call *my* mud walls: for pushing his advantage to the utmost, he throws back upon me the whole weight of what he is pleased to call my "*most undoubted* highly *respectable name*," and not content with this, he proceeds to inflict the "*coup de grace*," in the form of the most merciless irony by the superposition of my "*four*" poor worn out, *old field* Virginia plantations! mud houses and all! I pray my adversary, have mercy! I really never intended to give to the public an inventory of my old fields: but in truth, 'twas *indiscreet* in me to be talking, ah! *publishing* (*that's the rub*—) about *four plantations, old fields*, or what not, in these agrarian and democratic days: it is I find, too palpable an innovation upon the delicacy of public sentiment upon such subjects. Well! we must all pay for our experience, and as I am young yet, I shall hope to grow in discretion as I grow in years. But I must confess that I had expected a little more forbearance at the hands of a liberal and chivalrous gentleman of South Carolina. But enough! I now, in the words of Mr. Herbemont, "most cordially and in all sincerity offer him the hand of peace and friendship, and beg to be considered by him only as an humble fellow-laborer in the field of usefulness."

Mr. H. tells us that the Tower of Babel was built of mud, and that there are sufficient remains for this fact to have been ascertained by modern travellers—and Mr. H. takes credit to himself for this, his *heroic assistance*, as he calls it, in enabling me to establish the antiquity of mud walls. But I can't say that I am less sceptical about these *travellers' stories* than Mr. Herbemont himself. In short, I am willing to let the *facts* stated by me at first, stand just as they are—and will not permit Mr. H. or any one else to provoke me into a crusade in their behalf, even to the Tower of Babel. If the facts are worth nothing let them go for nothing.

PHILIP ST. GEO. COCKE.

OBSERVATIONS ON ARTESIAN WELLS, AND ON THE CAUSES OF THEIR FAILURES.

Translated for the Farmers' Register, from the *Annales de l'Agriculture Francaise*, for August, 1836.

[At various times, we have, in the Farmers' Register, given information of new and important facts in regard to Artesian, or overflowing wells—and have urged the extended application of this important discovery to new locations, and for new purposes, in this country. In France, the art of well-boring has rapidly extended, and is more and more engaging the attention both of practical and scientific men. In this country, it has attracted but little attention, and has been rarely put to use, except in the calcareous region of Alabama, where pure, or spring water could in no other way be obtained, and where the solid and homogeneous nature of the soft rock, (through which the borings penetrate for several hundred feet,) has rendered continued tubing unnecessary, and has made the

works both cheap and durably operative. But it is not only where the want of drinking water *compels* Artesian wells to be made, that they are wanted, and would be highly profitable. There are few situations, not abundantly supplied with pure springs and streams, in which Artesian wells would not be worth far more than the cost of construction—and nearly all towns, and all works moved by water power in cold climates, would derive eminent advantages from them. But, besides the prerequisite of convincing tbe public of the important use of these wells, there is needed the aid of science to ascertain and make known the laws that govern overflowing waters, and that would direct where they may be obtained—and the aid of art and experience, to avoid errors in the execution of the work. For the latter purpose, the following extract will certainly be useful to all persons who may design commencing such undertakings—and, perhaps, also to those who have already prosecuted those works with a satisfying degree of success. Even if the observations of the author should not induce the use of some means to avoid the waste of the ascending waters, we may at least profit by learning from him this important and encouraging fact—that a diminution of the flow of water which had been once obtained, does not prove a diminution of snpply from the source—but merely that it is wasted in its course, by the operation of causes which more care would have prevented.

We here shall give only the general remarks of the writer, and his more particular directions as to the tubing of bored wells. His subsequent statement of the purport of M. Viollet's memoir we postpone for the present—and may omit entirely, if the memoir itself (which is promised in the September No. of the *Annales,*) should be more satisfactory, and is suitable to be translated for this journal.

We have not stated the American equivalents of the various French measures of dimensions mentioned in the following article, because they are not important except to persons who design to make practical use of the information, and they can by them and others be easily estimated, by reference to the explanations of French weights and measures given at p. 119, vol. iii. and in other parts of this journal, and various other works.—Ed. Far. Reg.]

Extract from a *Report made to the Society for the Encouragement of National Industry, by the Viscount* Hericart de Thury, *upon a Memoir of* M. Viollet, *Civil Engineer, at Tours, concerning the application of observation and calculation to the dynamic action of Artesian wells, and upon the heights at which it suits to take the water, to put to use its entire power.*

Gentlemen :—M. Viollet, civil engineer at Tours, and member of this Society, has addressed to you a memoir upon the principal Artesian wells of that city and its environs. According to the manner in which he has treated the various questions considered in this memoir, a more appropriate title would have been, *A Theory of the application of calculation to the dynamic action of the water of overflowing wells, and upon the heights at which it is proper to take the waters, so as to make use of their whole power.*

The memoir of M. Viollet is, in truth, a theory entirely new, or until now unperceived, and spoken of by no one, before this able mechanician. To him, and to M. Saget, engineer of mines in the Department of Indre-et-Loire, to whom he says he was indebted for the first idea, belongs the priority: and I do nothing more than my duty in declaring, that, during the twenty years in which I have occupied myself with the art of bored wells, and in which time I have had communication with our best mechanicians, for the employment of the overflowing waters of these wells, no one has communicated any such theoretical ideas, on the application of calculation, as has now been done by M. Viollet.

Other persons may, with justice, claim the invention of the prior use of the overflowing waters of bored wells for working machines established in localities which were, until then, deprived of running waters: others will claim the application of these waters to wheels moved by other water, to the end that by their warmer and constant temperature they might hinder the formation of ice in winter on the wheels—and consequently, prevent the necessity of the stoppage of the works, which before was often caused during very cold weather. Other persons may also claim the application of the waters of bored wells to the warming of workshops and green-houses, by making them flow uncovered through such places, during winter; and others have used these waters to make artificial cress-beds, and for irrigating land, &c. But, I repeat, no one, before Messieurs Viollet and Saget, had thought of applying calculation, and algebraic formulas, to ascertain the dynamic power of Artesian wells. To them then, and especially to M. Viollet, belongs the first idea; as it is to M. Champoiseau, merchant of Tours, that is due the honor of having opened, in this country—notwithstanding the risks foreseen and willingly encountered—of having opened a new career to industry, in the employment of the overflowing waters of bored wells.

Thanks to you, gentlemen, to your offered prize, to your encouragements, our bored wells are extending more and more. They are now made in all parts of France—in England, Italy, Germany, Prussia, Russia—in Asia, Africa and America. But I will also say, that, in many places where they are attempted, the trials are made too slightly, and often, with an eagerness and zeal too little regulated by reason and reflection. It is not to be believed that all countries present equally the conditions necessary for obtaining overflowing waters. No! unhappily, no! Differences and difficulties are produced by the physical construction of certain regions, the nature of their rocks, and the manner of their position—the raisings, the upsettings, the breakings, the dislocations, which the strata have undergone since the information—in short by many causes, upon which I cannot now dwell, and to which I shall return elsewhere, because it is important to study them, and to know them well, before the boring for water can be carried on to the best advantage.

But these causes do not operate in the department of Indre-et-Loire, in which Mr. Viollet has conceived his theory of bored wells, since each trial there has been crowned with success, and

the success is so much the more remarkable, as the quantities of water obtained successively in each well have always been increasing since the first boring.

To make borings, to pierce the earth to reach spouting water, is not all that is necessary in constructing Artesian wells. The greatest difficulty does not lie there. When the ground is favorable, and the necessary conditions are presented, we may easily bring to light, and make overflow at the surface of the earth, the springs of subterraneous waters: but the great difficulty is to maintain and preserve the entire volume and force of water which the source furnishes, and preventing any after diminution of its quality, power or effect. Such is the true difficulty, such is the principal rock that the Artesian well-borer can strike upon. On this account, in my divers reports upon the principal bored wells with which I have had acquaintance, have I always particularly dwelt upon the necessity of tubing them with the utmost care, and through their entire depth. In truth, earth which appears most compact often presents numerous fissures, or cavities, or beds of sand and gravel, of which the boring may not show the true state, nor the degree of permeability. The subterraneous water, in rising, at first filters through the passages imperceptibly: but if this infilteration is allowed to continue, it soon increases: it opens, it rapidly enlarges the at first small issues, then the waters spread through the earth; they make way for their passage, and soon or late, they are lost entirely.

I have often cited examples of excellent bored wells, which had been the admiration of the country, which had caused a general enthusiasm to prevail, to that degree that none doubted but that there was under the country a subterraneous sea ready to rise up wherever the earth was pierced: every body wanted to have bored wells, so that the workmen could not serve the demands which arrived from all sides. But soon this ardor subsided; and the admiration ceased almost as quickly, when it was seen that the overflowing waters rapidly diminished, and soon even ceased to rise; and this entirely for want of proper care and precaution in the tubing of the wells. I have even reported an example perhaps, the most striking, that of a bored well, the waters of which, as abundant as impetuous, after having inundated the garden of the proprietor, who, as he said, only wished to have a little river and lake, (in the style of English garden,) but of which the waters, in their fury acknowledged no dike, no obstacle able to arrest their course, overthrowing the partition walls, and even overflowing the adjacent grounds, to such extent that the proprietor, not being able to govern the water, was condemned to make a subterranean aqueduct, to rid himself of the excess of his river, and to prevent the occurrence of new disasters. But his aqueduct was not yet finished when he had the grief of perceiving his cascades successively to become feeble, his river to diminish, and next even to cease to flow, because his well had not been tubed its full height; and because, for mistaken economy, he had besides, committed the fault of using tubes made of common sheet tinned iron, which, being quickly destroyed, suffered the rising water to be lost in the sandy and permeable beds of earth traversed by the well.

In his communication, M. Viollet says, that being charged with applying the motive power of the water of a bored well to a manufactory, he deemed it necessary previously to study the various bored wells of Tours, in order well to ascertain the power of the water of which he could dispose, and to assure himself whether the supply was constant: but that frequent measurement of the volumes discharged had soon convinced him of a progressive diminution, which he attributed to the wells not having been tubed through their whole extent; that consequently they experienced considerable waste from filtration, and a gradual decrease, which had not been perceived at first, because that the wells bored for the municipal administration of the city of Tours, sent their combined waters to different public fountains, through subterraneous conduits.

It was in studying thus the power of the Artesian wells of Tours and in repeating successively the measurements of their products, that Mr. Viollet conceived first the principles of his theory —of which the application appeared to him doubtful and uncertain when he had established the progressive diminution of the power—but upon the success of which, however, he was re-assured, when he arrived at the certainty that the Artesian wells always preserved their full power, when they had been tubed through all their height, and with proper care and precautions.

The examination of the memoir of M. Viollet having led me to speak of the decrease of the waters of bored wells, in consequence of the defects of the tubing, I think it proper to suspend my remarks for a moment, for the purpose of introducing some developements upon the tubing of wells, one of the most important operations of the well-borer, since on it the success of the work generally depends.

There are used, to tube bored wells, pipes either of wood, of cast metal, of iron, of sheet iron, of sheet tin (*fer-blanc*, tinned iron,) of zinc, or of copper.

1. Pipes of wood are used for wells of no great depth, or which do not exceed 40 to 50 metres. In Artois, there are wells bored at a very remote epoch, the ages of which are not known, which are lined with wood which has never needed repairs, unless at the upper extremity, at the open air, and which part has to be renewed once in 20, or 25 years, and often in less time. These pipes are made like those for pumps and fountains, of the wood of alder, elm, oak, &c. The wood of alder is generally preferred to the two others: it is easy to bore, is less dear, and is very durable. They bore these pipes laid horizontally, with an auger worked either by hand, by horse power, or by a water wheel. They give to those pipes a diameter of 0.10 millimetres to m. 0.20. Their length is as great as the bodies of trees that can be had without defects. The joinings of the pipes are made by the end of one pipe being cut to enter in the end of the next, and the joining encircled and secured by a hollow cylinder (*frette*,) of metal.

2. Pipes of cast iron are used by different well-borers, in preference to pipes of wood; and yet they offer some serious inconveniences, according to the nature of the ground, and of the gas or other principles contained by the water. These pipes unite with each other by the one end entering and fitting into the other, with soldering,

brazed, or with *mastic de fontenier*. The diameters of the pipes are from m. 0.10, to m. 0.20. and even m. 0.30. These pipes are also subject to the danger of being sometimes crushed under the blows of the rammer, by which they are driven down. Still, notwithstanding these objections, tubes of cast iron are often used with success in France and in England: but it is necessary first to test their strength, and to be assured of the quality and nature of the metal before they are used.

3. Pipes of sheet iron resist injuries better than the cast. None but the thick hammered sheet iron should be used—not the *tole laminée*. The thickness of the sheets used is from m. 0.005, to m. 0.006. These pipes are united by brazed soldering, and by being fitted in each other and fastened with iron pins, which are *counter-sunk*, or lost in the thickness of the sheet iron. The diameters of these tubes are from m. 0.10, to m. 0.20. These pipes are used with the greatest success, when sheet iron of the best quality is the material. Some persons have these pipes tinned, to prevent their oxydation, and the consequent coloring of the water. This precaution is very good; but it requires much care, and presents difficulties in the tinning of the joints. In short, it is important not to use, for cheapness, sheet iron that is too thin, because it is decomposed quickly, and when holes are thus once made, they suffer the ascending water to escape into the permeable earth.

4. Pipes of common sheet tin [that is, of very thin iron washed with tin,] have been used in England, and their inconveniencies have been evident, on account of their weakness, and their quick decomposition. They ought never to be used, unless as temporary and provisional means, for want of, or while waiting for permanent pipes. Still it is preferable to make use of pipes of thick sheet iron, well tinned, having care that the joints are again well covered with tin, as it is apt to be exposed at the cut, or place of contact of two pieces of pipe: when they receive a double tinning, it is said, they are not liable to any causes of decay, and are perfectly well preserved. They are from m. 0.20, to m. 0.25 and m. 0.30 in diameter.

5. Pipes of zinc, from m. 0.10, to m. 0.20 in diameter, have been used in some bored wells, in preference to sheet iron tinned, for cheapness. But these pipes are not always of long duration. They are subject to be speedily decomposed, and last but a little time in certain kinds of earth, which appear to exert upon the zinc a powerful decomposing action—or rather, perhaps, from the effect of the galvanic action which is exercised between the zinc and the iron of the boring instruments. Thus zinc tubes should not be used except for temporary purposes, and in that case, sheet iron tinned would be preferable.

6. Pipes of copper are not so costly as might at first be supposed. They are not subject to decay or destruction, and are employed with the greatest success for the great bored wells of public fountains, and of factories. Thus, at St. Denis, at Tours, at Elbeuf, &c. bored wells have been tubed with copper: and as the metal used is only from m. 0.003, to m. 0.004 in thickness, the expense of the material has been compensated by its small degree of thickness, and the advantages of the unalterability of copper, after its surfaces are bronzed.

I think that pipes of wood, alder, elm, or oak, may be made use of with success in wells which are not more than 40 to 50 metres in depth: but that the preference should be given to pipes of copper when the wells exceed that depth, or when, from the nature of the ground, there is reason to fear great difficulties in putting down wooden pipes: since a well once tubed with copper, will never need repairs.

The prices of tubing vary according to the material used. Thus—cast iron pipes, according to their diameter, are worth from 12 to 15 francs the running metre: hammered sheet iron, at 2 francs the kilogramme, 18 francs the running metre; and pipes of red copper, at 4 francs the kilogramme, are from 25 to 27 francs.

As to the precautions to be taken in placing the pipes, the most essential, and those which should be particularly recommended to well-borers, are these: 1st. To put down tubes of ascension (or those in which the water is to be confined in ascending,) as low as the deepest hard and impermeable bed of earth which lies immediately over the water-yielding bed, from which burst up the overflowing waters: 2nd. To pour behind the tube of ascention, whether between it and the earth, or between it and larger temporary pipes, a cement or *grouting* of hydraulic lime of the best quality—which is strongly objected to by many, even to this time. One of the best examples of tubing, thus executed, and which deserves to be considered as a model, is that which Mr. Degousée has constructed in the well bored under his direction in the *Abattoir* of Tours.

For the Farmers' Register.

WHICH IS THE BEST ROUTE FOR A RAILWAY TO THE SOUTH-WEST?

A writer over the signature R. N., in the Farmers' Register for September and October, has brought before the public a plan, or route, for a south-western railway, a part of which is practicable, and will be useful and profitable if carried into effect. A part I consider badly located; and nothing but actual survey, and mature consideration of the various interests affected by the railway, will enable the public to determine on the proper route. Some of the general principles laid down by R. N. are undoubtedly correct; but he has not, in my opinion, in laying out his work, conformed to his principles. His views are too general; so much so as to serve and forward but few particular interests; and if but a small portion of the special interests of the state are benefited, it follows of course that the general interest is but little promoted. My object however is not to enter into discussion with R. N., but to lay before the public my own plan for a south-western railway, or railways; and all I ask for it, is a just decision after actual survey, and comparison with other routes. I cordially concur in the sentiment, that public advantage and interest ought under no circumstances to be made to yield to individual interest. In such a work as a road or railway, however, the term "public and general interests" must have a more limited meaning than that which would make it embrace the whole state of Virginia, the city of Richmond, the James River and Kanawha Company, &c. I mean that there are some great

and important improvements that ought to be made, even though they might not directly benefit the city of Richmond, or promote the interest of the James River and Kanawha Company, or benefit directly that portion of the state lying on James River. I am no enemy to these great interests: I wish to see Richmond a first rate city, and think that every one who loves Virginia ought to wish success to her great central improvement, which is progressing under the care of the James River and Kanawha Company; and for the whole state, I am in favor of a liberal system of internal improvement. The south-western railway is a work more particularly for the benefit of southern and south-western Virginia. Richmond and Petersburg as the ultimate markets and shipping ports for this south and south-western country, have their interests too; and Petersburg being the natural market of my part of the country, I shall discuss the subject more especially with a view to the interest of that town. As a general remark, the truth of which will be admitted, no doubt, I would state as a fact that improved roads to market, railways and canals, chiefly originate with, and are made by the enterprise and capital of the towns; hence it is important to the success of a great work, that such advantages be offered to the towns as to enlist them in favor of it, and thereby get command of the necessary capital to carry on the work; and if you by the work improve the market towns in the line of the improvement, as a matter of course you render important service to the country around about and convenient. A railway from the tide water of James River to the south-west, extending to the limits of the state, is a work called for by the wants of an extensive and fertile country, is a practicable work, and will beyond dispute, pay a good interest on its cost. That I do not assume too much in this proposition, is proved by the fact, that this extensive country is extensively and profitably employed in making bulky articles for market, and sending them to market over the worst and most expensive roads in North America. And surely if it can prosper under such a system, how much more must it prosper when its burdens are diminished by the facilities of a railway, and this railway maintained by one-fourth of what it costs the farmer to use the present roads? To be the most beneficial, this railway must, as far as practicable, pass through those counties farthest removed from navigation, and at the same time capable of affording the greatest amount of tonnage for the road. The proposed railway is a great and costly work, and one which cannot be executed, unless every important interest can be reconciled and combined, and be brought to use their power and influence to promote the object. One important matter is to settle the manner in which this great work shall connect with the tide water. In this great work, as I have before stated, Richmond and Petersburg both have important interests. A large portion of the interests of these two cities can be made common and the same, in the execution of the great work; but in some respects their interests are rival, and so far each town must provide for its own peculiar interest. It cannot be expected that Richmond will lend her aid in constructing a railway from Petersburg to the south-west, or that Petersburg would assist in making a railway to the south-west from Richmond, or that Richmond or Petersburg either would submit to a continuous railway passing through to carry trade to a rival town. It would be absurd to expect it. What town or city ever thus acted? Railroads to Petersburg or to Richmond, must stop at the respective places and deposites, even though "tavern keepers and hack-men" are benefited thereby. I lay it down as settled in practice and precedent. My plan is to construct a rail road from Petersburg to Lynchburg, and from Richmond to Lynchburg, and that as large a portion of this road be common and the same as the nature of the case will admit of—and from the point where one road will cease to answer both towns, let there be two roads, one leading to each. I think if this plan is adopted in good faith, there need be no money vested in routes unnecessary and uncalled for, and the influence of Richmond, Petersburg, Lynchburg, and Farmville, and all the southern and south-western counties will be concentrated on the great work. The point where the road shall begin to be common and the same for both cities, must be agreed upon by a friendly consultation of the parties interested, and surveys on joint account made to gain all necessary information. This can be done at once, as a considerable portion of the amount required to pay these expenses is already subscribed. The route recommended by R. N., from Petersburg to the south-west, may, with some important variations, be adopted by Petersburg as her connecting link with the great south-western road. The point where sound policy will direct the roads to unite, will be either at Farmville, or on the southern ridge route to the east of Farmville. It would be a matter of little consequence to Petersburg, whether the branch from Richmond met the branch from Petersburg at Farmville or at some intermediate point east of Farmville, as the improved navigation of the Appomattox will secure to her more of the trade of Nottoway and Amelia than she has heretofore enjoyed; and as the whole work must be undertaken and executed by one company, it will be well to fix the location of the Richmond branch so as to insure the greatest profit to the stock holder. This view I think would place the branch from Richmond, on the ridge between the James and Appomattox Rivers. This location through the heart of the counties of Chesterfield, Powhatan and Cumberland, would leave to this branch extensive trade and travel, sufficient perhaps to support it, and pay fairly on the capital expended. No difficulties present themselves on this route until the crossing of the Appomattox River at Farmville, and this a slight one, as the ground is even and the slope gradual. This portion of the route, from Raines' Tavern to Farmville, has been already surveyed and estimated. From Farmville the route would cross Buffalo River near its junction with the Appomattox, and by an easy ascent attain the summit of a ridge which is even and unbroken to New London. This ridge must be the location until you approach Lynchburg within a few miles; that town can then be reached by one of the ridges which set off at right angles to the main route. The importance of making Lynchburg a point on the line, will be readily admitted by all who will consider that it is one of the largest inland towns in the state, a place of great and increasing trade, which is attracted to that place from north, south, east and west, and that it

will be probably the starting point for the rail road to the north-west, extending to the Ohio, as well as the starting point for the rail road to the Tennessee line. It would be absurd to pass by such a place as this, if we could do so. It is the point where we may expect to meet as much trade and travel as will give full occupation to those to the eastward of it, with both its branches. There is another route which has been spoken of for the continuation of the Richmond ridge road, that is through the county of Buckingham on the north of the Appomattox. This route offers too many difficulties, and no peculiar advantages as compared with the route on the south side of the river, to be selected. R. N. recommends from Petersburg a route on the great ridge dividing the waters of the Appomattox from those flowing into the Albemarle sound, passing by Nottoway Court-house, Chalk Level, and around or across the head branches of Bush and Buffalo Rivers, and on the same ridge as it meanders to New London. I recommend the same route from Petersburg to Chalk Level or Burk's Tavern, a distance of fifty miles, from thence to Farmville on a level ridge a great part of the way, a distance of fifteen miles, and the distance by the railway will be near about the same with the public road, and no difficulty in this section greater than will be found on the other route. The railway will descend by an easy and practicable grade along on the east side of Sandy River, to the mouth of Bush River. The crossing will not be difficult or expensive, and thence the route to Farmville will be quite easy. The distance from Farmville to Lynchburg does not exceed fifty miles, making the whole route one hundred and fifteen miles. Great and immediate advantages are offered to Petersburg by the early construction of the railway on the southern ridge route. The trade and travel of the counties of Dinwiddie, Nottoway, and parts of Lunenburg, Mecklenburg, and Amelia, would fall to this railway; and considering the increased tonnage which would be caused by this improved way to market, there can be but little doubt that these counties would support the road, independent of the tonnage and travel additional after arriving at Farmville; and the continued increase as the road advanced to the westward. All passengers to Norfolk, and those preferring the steamboat route to the northern cities would prefer the southern route, as well as all who are going north and have business in both Petersburg and Richmond. When the rivers are obstructed by ice, goods put on the railroad at City Point would seek this route, as James River is often closed above City Point when it is not below. The great general advantages to be gained by the adoption of such a plan as this, are, in the first place, the combination of the influence and enterprise and wealth of all the towns interested in the southern and southwestern trade, for the execution of the great and important work of a south-western railway. Secondly, the whole south and south-west of the state gain the advantage of an easy and cheap way to market; and a choice of markets and increased consumption for the products of the country. Petersburg will be particularly benefited, by receiving a share of the western trade; and all that part of Virginia for which Petersburg is the natural market, will be benefited in proportion as that town is increased in capital and trade. The Charlotte Convention has been brought into the discussion by R. N., not very much to its advantage. This convention was called by somebody from some quarter unknown to the writer; with the avowed object of considering the propriety of a survey of a rail road from Farmville to Danville, passing near Charlotte Court-house; and I think its resolutions might easily have been construed to recommend a railway from Petersburg by Farmville to Lynchburg, from Richmond to Farmville, and then by a common route to Lynchburg, and a rail road to Danville from Farmville. If this last should ever be accomplished, it will afford additional employment for the eastern branches of the great south-western rail road which I have endeavored to recommend. From my acquaintance with Farmville and its people, I think I can clear that little town of the presumption of demanding or recommending that all these great works should pass through her limits. The improvements have been recommended by strangers as well as friends; and that place would be strangely blind to its own interests, if it were to remain indifferent to such offered advantages, and to the advantages of location which it possesses.

It is proposed above that the whole work of a south-western railway should be done by one company incorporated for the purpose. If however the road from Lynchburg to the Tennessee line be secured under its present charter, it will form a part of the great south-western route, and ought to be begun at Lynchburg at the same time that the road I have recommended shall be begun at Petersburg and Richmond. The route from Petersburg to Lynchburg or New London, through Farmville, is shorter than the route on the ridge which passes around the head springs of Bush and Buffalo Rivers; and offers the advantages of the trade of Cumberland and Buckingham, which would be lost to the other routes, as well as all other trade and travel concentrated at Farmville.

The above plans and routes for railways are submitted to the public. The subject is interesting to southern Virginia, and if no other good is effected, the writer hopes it may cause its further discussion by those who are more experienced.

E.

Oct. 3, 1836.

Extract from the (London) Farmer's Magazine for September, 1836.

THE EFFECT OF SOOT ON WHEAT.

I had last week an opportunity afforded me by a friend who farms on a dry and inferior soil, of witnessing the effect of the application of soot on young wheat in the spring. The field to which I now allude, has been partly dressed over at the rate of thirty bushels of soot to the acre, and it is quite astonishing to see the benefit that it has afforded to the crop of wheat. Nothing can be more conclusive as the virtue of this description of dressing, than the experiment which I am now speaking of. The field was sown with wheat out of a clover ley, without any manure being laid on, the whole of the piece having been previously to this year farmed in an exactly similar manner.

The field perhaps is seven acres, and about four acres (the poorest part of the enclosure) were selected for sowing the soot on, the remaining three acres not having any soot applied. I have no doubt but that at harvest there will be eight bushels of wheat more an acre on the part that was sooted, than there will be on the part to which no soot was applied. The cost of the soot was sixpence a bushel, being at the rate of fifteen shillings an acre for thirty bushels. The whole of the expense attending the dressing will not exceed twenty shillings per acre, the increase of the value of an acre of wheat will be forty-eight shillings, or eight bushels of wheat at six shillings a bushel, thus leaving a net profit of twenty-eight shillings per acre after deducting the cost and expenses of the soot; and as to any additional labor brought about by an extra crop, such as reaping, thrashing, harvesting, &c., the increased quantity of straw will entirely liquidate.

From the [British] Veterinarian.

IMPORTANT TRIAL.

A cause very important to the farmer and the veterinary surgeon was tried at the Nottingham Assizes on the 24th ult. We present our readers with the substance of it.

The plaintiff, Mr. Jackson, of Stapleford, near Nottingham, was owner of several parcels of meadow land, through which ran a small stream of water of excellent quality. It was called the Syk Brook. Near its source is a *cromlech* in unusual preservation. It is one of the most perfect Druidical remains which the midland counties possess; and a legend is attached to the brook, that in days of yore, the sick used to resort to this spot, and, after certain Druidical incantations and ceremonies, and drinking of the water which ran beneath the cromlech, they were cured of all their diseases. However this might have been, these meadows had been in the possession of Mr. Jackson's family for some centuries, and the cattle had always done well.

Thirteen years ago the defendant, Mr. Hall, erected some buildings for the manufacture of starch near the brook, and above Mr. Jackson's meadows. No change was observed in the water, or the condition of the cattle for the first two or three years; but at length the water used in the manufacture of the starch found its way into this brook in considerable quantities, and then the milk of all the cows rapidly diminished, many of the cattle became seriously ill, and in the course of some years no fewer than twenty-six of them died, and all of a disease accompanied by nearly the same symptoms, and the fish and the frogs which had peopled the brook all died.

In the manufacture of the starch the wheat from which it was obtained was first ground. It was then macerated in water until the gluten was dissolved and the starch precipitated, and the bran was left floating in the tank. It had now underwent very considerable fermentation, and the whole mass was in the highest state of putrefaction, and exceedingly offensive both to the taste and smell. The liquid containing the dissolved putrefied gluten was now drawn off, and was preserved for sale. It was supposed to be an excellent manure, and for a while there was considerable demand for it; but at length it lay upon hand, and was thrown away, and took its course down a ditch into the Syk Dyke, and that, occasionally in a quantity greater than the original stream.

The bran underwent various washings, and, being sufficiently cleansed, was given to the pigs.

The starch, however, required another process in order to fit it for use. The smell which hung about it was to be taken away, and the starch was to be bleached. For these purposes a solution of the chloride of lime was employed, and when that had done its duty, it too was turned into the stream.

Sulphuric acid was also used in considerable quantities, in order to perfect the manufacture. That also ultimately found its way into the watercourse.

At length the defendant yielded so far to the remonstrances of the plaintiff as to construct a *sough*, or circular tiled drain, through the plaintiff's grounds, by means of which the empoisoned water was conveyed to a river at some distance, the volume of the stream of which was supposed to be so considerable as not to be materially affected by admixture with these deleterious ingredients.

This being effected, the fish and the frogs began to return to the brook, and the weeds grew on its banks, and the mortality seemed to cease among the cattle; but the defendant refused to make compensation for the cattle that were previously destroyed. In order to recover this compensation, an action was brought.

[The voluminous evidence, we omit.]

Verdict for the plaintiff, £270 damages.

From the (London) Farmers' Magazine, for September, 1836.

CULTIVATION OF POTATOES.

Sir:—I observe it stated, that in some counties there is a great failure of the potato crop; this, I think, may be remedied by sowing the seed. Sets will not last above twelve or fourteen years; after that time they decline, and hardly return treble seed. I tried the experiment last year, in a small way, and the produce was astonishing. What is very remarkable is, that these seedlings produce potatoes of different kinds, and sometimes new sorts are procured. It is no difference whether the apple comes from one kind or another. I saved the red rough seed, and I had five sorts from it.

The following is the method I took, to get them the size of hen's eggs in one year:—Take a bunch of potato apples, of any sort, in November, when they are ripe; hang them up in a warm room during winter, and at the end of March, separate the seed from the pulp, by putting them into a basin of water until they are soft; squeeze them with the fingers—gently pour off the water, and sow the seeds in drills with the feathers of a goose quill in a good bed of earth. When the plants are about an inch high, draw a little earth up to them with a hoe in order to lengthen their main roots: when they are about three inches high, dig them up and separate them carefully from each other in order for planting out in the following manner. Prepare a piece of fresh ground by trenching it well, dig up the seedling plants as before directed, and plant them out in the ground thus prepared in such a manner that there be 16 inches between

each plant. As they advance in growth, let them receive one or two earthings up, in order to lengthen the main root, and encourage the shoots under ground. By this management potatoes may be brought to a good size in one year.

Southmoulton, July 19.

EXCERPTA CURIOSA.

1597.—In Carrick, are kyne, and oxen, delicious to eate; but their fatness is of a wonderfull temperature; that although the fatness of all other comestable beasts, for the ordinarie vse of man, doe congeale with the cold aire, by the contrarie, the fatnesse of these beasts is perpetually liquid like oile.

1765.—There was in the parish of Braunston, in the county of Rutland, an ewe which had seven lambs, all alive, within less than a year; and when fat, did not weigh above fourteen pounds and a quarter.

1765, July 14.—A curious mare, 28 inches high, from the East Indies, was brought in a coach from Gravesend to Leicester Meuse, and after being curried and dressed, carried in a coach to Carleton-house, when it was shown to the Prince of Wales, who seemed highly pleased with it; afterwards it was carried in a coach to the Queen's Meuse. This was a fine little animal, of a dun color, the hair resembling that of a young fawn's. It was said to be four years old, well proportioned, had fine ears, a quick eye, and a set of fine teeth with a handsome long tail, and very good natured. Qy. Did she breed in England?

From the (London) Farmers' Magazine.

A NOTELTY IN BREEDING.

It cannot be too extensively known, for the benefit of breeders and fanciers of horse-flesh in general, that by pursuing the plan of Jacob of old amongst the flock of Laban, horses may be bred of any color or possible combination of colors. Dr. Thomson, of Hamilton, in the case which lately took the round of the newspapers, actually followed the suggestion of the Patriarch, and got a celebrated animal painter to take Batty's beautiful horse, which painting was placed constantly in the stall before the mare during the period of utero-gestation. We know of seven gentlemen in this neighborhood (Hamilton) who are following the same course with their mares this season; and we only fear that the mania may extend among the farmers, and tend to annihilate the celebrated Clydesdale breed. An animal painter has taken a residence in town for the purpose of enabling himself to supply the demand of the country gentlemen for *fancy* horses.

From the (London) Farmers' Magazine.

MACHINE FOR THE UPWARD TRANSMISSION OF WEIGHTS.

A very ingenious machine for the upward transmisson of weights of any description is now on exhibition at the Mining Hall, next Exeter street, and deserves the attention of mine proprietors, wharfingers, and all persons who have the management of extensive stores, as one well calculated to save a great deal of time, labor, and expense. The construction of this power is very simple, and its steady operation is quite assured. Its chief agent is a pair of wheels; or, if necessary, a series moving with their diameters in the direction of the weight to be raised—say the shaft of a mine. Taking the one pair of wheels, moving on the same fixed axis, we find that from the end of a radius or arm in each, a chain descends, so as to hang on opposite sides of a square passage. To each chain are suspended, at different but regulated distances, quadrangular frames, to the upper sides of which, strong projecting iron rims, moving on the principle of the hinge, are attached. The boxes, or receptacles for the weight to be raised, have corresponding edges on each side. When the wheel above is turned, and a single box below is placed in connection with the lowest frame, it is caught by its rim, and with one revolution of the wheel is sent up as high as the frame on the opposite side to that on which it is borne: here it is again caught and sent up to the apparatus on the opposite side again, and so on, by alternate transmission, it is brought to the top of the shaft. The machine being kept constantly laden below, and its wheel constantly turned above, it follows that at each revolution of the wheel a box is delivered: and thus, in an exceedingly short space of time, a vast body of matter can be carried up through any depth of shaft. It is not easy to describe such machines, however simple they may be, in very simple or intelligible language, and we have not been much practised at specifications. We must therefore leave scientific men to understand us through their own quick intelligence; and to all others whom the matter may concern, we recommend the employment of their own eyes. The machine could be most humanely employed in great mines in quickly sending the workmen up or down, to save them from their present tedious and tiresome expedients for that purpose. In unlading ships at wharfs its opration would be found amazingly rapid and proportionably convenient. It may be remarked also, that its operation is wholly unaccompanied by danger, and that its speed may be accelerated or diminished, or it may be stopped altogether at any moment, with perfect facility and convenience. On the whole, we must confess that we were struck with the complete efficiency of this admirable invention, which we are glad to find is protected by patent.

HORSE RACING OF OLD.

The deed is still preserved among our city archives, by virtue of which the Town Cup is annually given at Salisbury races. It bears date March 28, 1654, and is a compact between Sir Edward Baynton (as the representative of certain noblemen and knights who subscribed a fund for the purpose) and the mayor and commonalty of Salisbury. Under this deed the latter received £320, and thereupon bound themselves to provide annually for ever, "a faire cupp of silver gilte with gould," of the value of £18. Among other curious regulations to be observed at the race for the cup, it is ordered, in the aforesaid deed, that the corporation shall provide yearly "three men with muskets to be charged with powder, to be discharged as followeth—that is to say, one of the said three men to stand at the first myles ende

from the starting place of the said race, and there discharge his musket as the runninge horses passed by hym; one other of the said three men to do the like at the second myles ende from the said startinge place; and tother of the said three men to do the like at the end of the third myle from the said startinge place." The improvements in the speed and breed of our modern race horses have long since rendered unnecessary this very ingenious method of urging them to the goal.—*(London) Farmers' Magazine.*

For the Farmers' Register.

COMMERCIAL REPORT.

No important variations in the prices of domestic produce have occurred during the past month. Previous to that time, the current rates of tobacco had declined some 30 or 40 per cent. below those of May, June, and July. The lower qualities now command 3 to $5 per 100 lbs.; the better sorts 5½ to $7, and fine 7 to $8½, beyond which, scarcely any is sold. New *primings*, (a description of tobacco which the manufacturers apply to some use,) sell at 1 to $2 per 100 lbs. The product of tobacco has been greatly and injuriously increased of late years, by the practice of bringing to market all sorts of trash, which formerly served for manure.

The inspections of tobacco in Virginia, during the year ending the 1st of this month, amounted to 45,445 hhds. and the foreign export to 30,000, against 47,520 inspected, and 26,000 exported in 1835. Exclusive of the inspections, a considerable quantity is brought to market *loose*, and sold to manfacturers. The receipt at New Orleans, was 49,934 hhds. against 35,890 in 1835, and 24,963 in 1834. A very large increase is expected in the Virginia and western crops the ensuing season, and a consequent overstock in all markets.

Some interesting statements of the tobacco trade have been compiled, by Messrs. Riley & Van Amringe of Philadelphia, from which it appears, that in the years from 1772 to 1775, the annual export from the colonies averaged nearly 100 millions of pounds: during the revolutionary war, the average was little over 12 millions, and the cultivation of it in Europe was then commenced. It has since been continued more or less extensively, according to circumstances. France presents a remarkable instance of increased cultivation under the inducement of high prices. In 1818, there was grown 18½ millions of pounds—in 1819, 26 millions, and in 1820, 33 millions, equal to 27,500 hhds. of 1200 lbs. each.

The consumption of tobacco in France is now estimated by the government at 12 millions of kilogrammes, or about 26 millions of pounds—of which, about 14 millions is grown in France. The quantity on which duty is paid in Great Britain, for home consumption, (of all sorts,) is about 16 millions of pounds, and in Ireland, between 4 and 5 millions—together producing a nett revenue to the government of £3,000,000, or nearly 15 millions of dollars.

The export of tobacco from the United States in 1790, was 118,460 hhds., and it declined gradually to 58,000 hhds. in 1797. The price having advanced as the supply diminished, a new impulse was given to the cultivation and the export increased until it reached 103,700 hhds. in 1801. The price again declined, and the export varied from 71,000 to 83,000 hhds. until the interruption of commerce by embargo, and war; since which, it has been,

	hhds.		hhds.		hhds.
In 1815,	85,300	1822,	83,200	1829,	77,100
'16,	69,200	'23,	99,000	'30,	83,800
'17,	62,300	'24,	77,900	'31,	86,700
'18,	84,300	'25,	76,000	'32,	106,800
'19,	69,400	'26,	64,100	'33,	83,100
'20,	84,000	'27,	100,000	'34,	88,000
'21,	66,800	'28,	96,300	'35,	94,300

The greatest annual value was in 1816, $12,809,000; the smallest in 1831, $4,900,000—generally about $6,000,000.

It thus appears that the export of tobacco was nearly as great previous to the revolution as it has been since.

Of manufactured tobacco, the foreign export has gradually increased from 593,000 lbs. in 1820, to 3,818,000 lbs. in 1835, inclusive of a large quantity which is sent out of the territory of the United States without being reported at the custom-houses. The quantity manufactured in Virginia, is supposed to exceed 20,000 hhds, so that only about one sixth of *that* quantity is exported, and as a great deal is manufactured in other states, the consumption of this country must be in a greater ratio, to its population, than that of any other.

The product of the crop of cotton grown in 1835, has been ascertained, and exhibits an increase of 106,300 bales on that of 1834—the receipts being thus in

	1835, bales.	1836.
New Orleans,	511,146	481,536
Mobile,	197,692	236,715
Florida,	52,085	79,762
Georgia,	222,670	270,121
South Carolina,	203,166	231,237
North Carolina,	34,399	32,057
Virginia,	33,170	29,197
	1,254,328	1,360,625
Shipped to G. Britain,	722,718	771,148
France,	252,470	266,188
N. Europe,	29,803	54,889
Other ports,	18,508	24,678
	1,023,499	1,116,603
Manufactured in U. S.	216,883	236,733

This does not include any that was manufactured south and west of Virginia, which is obtained directly from the producing country, and must be cosiderable in the states bordering on the Ohio river.

The quantity manufactured in Virginia, east of the mountains, is estimated at 8,000 bales, and as new mills are being erected, there will be an annual increase.

Some extensive mills have been commenced in North and South Carolina.

The manufacturers in Europe, and in this country, have full and profitable employment: the demand for goods having kept pace with the increase of manufacture and cultivation. High prices have induced an increase of culture in the East

Indies, from whence unusually large supplies are arriving in England.

The new crop is later than usual in this part of the country—the quality is good, and the present price, (in Petersburg,) 17¾ cents, is such as should induce the planters to lose no time in sending it to market. The crop in the western states is reported to be large, and a full one in the south, so that an increase of 100,000 bales on the product of 1835, is the least that can be expected, and 150,000 not improbable.

The apprehended deficiency in the crop of wheat is realized, and the supplies are so small that scarcely any flour is shipped from Virginia; and for the first time, the millers of Richmond and Petersburg are about to obtain wheat from Europe. Large importations of foreign wheat continue to arrive in all the northern markets; but although the appearance of the grain is fine, it does not make good flour, without an admixture with our own. The price of wheat is from $1 75, to $2 15 per bushel: of flour, 9½ to $10, and for best family $12½. These high rates induce the farmers to hold their corn for a better price than is now current, say 80 cents per bushel. The crop on the navigable rivers is a full one. The inspections of flour for the quarter ending 1st October, compared with those of last year, exhibit the following result.

	1835.	1836.
Richmond,	43,069 bbls.	16,133
Petersburg,	9,383	2,536*

An intelligent writer in Philadelphia has published an article on the subject of grain, which comprises much information. He says, "this country has been called the greatest wheat growing country, for the extent of its population, and it may have been so forty years ago, when its population was small and wheat flour constituted the most valuable article of export. But that country cannot be so called which now raises more cotton, more tobacco, and more rice, *for export*, than any other country, and at the same time produces more Indian corn than of all other kinds of grain together, and is constantly extending in the growth of cattle, sheep and swine, and in manufactures of every description. In fact, the growth of wheat, it is evident, has not increased, *pro rata*, with our population."—"The inquiry has been often made what is the quantity of different kinds of grain raised in the United States, making a fair average crop? This cannot be answered with accuracy in the present state of our information on the subject, but from the best attainable, we have estimated those crops as follows.

"Indian corn,	100,000,000 bushels.
Wheat,	50,000,000
Rye,	20,000,000
Oats,	20,000,000
Barley,	1,250,000"

The pressure for money in our great commercial cities is almost unparalleled. The rate of discount on good paper is as high as 2 per cent. per month or more. Stocks of every sort have continued to decline, and are lower now in New York and Philadelphia than at any previous period during the year. Even those which divide more than 6 per cent. are considerably below par. The monetary system of the country is in disorder: remittances cannot be made with any facility from one place to another—a difference of several per cent. is made in internal exchanges—no currency of general circulation exists—except an imaginary gold one. The large expenditures on works of internal improvement, and investments in lands, &c. require the active use of all the capital of the country; and this is prevented by the vast accumulation of nearly 50 millions of dollars in the government depositories.

The price of labor, of provisions, and of almost every thing, has advanced during the current year—common laborers are hired at double and even treble the wages formerly paid. The profitable culture of cotton has attracted to the west a vast portion of the labor of the southern states—and the extension of rail roads in every direction calls for more labor than can be spared from agriculture.

Looking from general to local matters, we find the rail roads north and south of Richmond in progress toward completion. The construction of the Raleigh and Gaston Rail Road is commenced, and about one half of the line is under contract. And no sooner is this work begun than a survey is undertaken from Petersburg to Farmville, and proposed to be continued to Lynchburg and Danville. A conditional subscription is already made, in Petersburg alone, of more than $200,000, for the stock of such a road, in anticipation of a charter.

The receipts of the principal articles of produce at New Orleans may be worth recording.

		1834.	1835.	1836.
Tobacco	hhds.	24,963	35,890	49,934
Cotton	bales,	465,103	531,366	498,895
Flour	bbls.	320,660	285,708	287,191
Sugar*	hhds.	29,582	47,018	5,677
Bacon in	hhds.	7,318	8,243	7,315
in bulk	lb.	615,324	1,519,330	851,263
Pork in	bbls.	91,985	93,381	70,816
in bulk	lb.	2,603,860	7,160,934	5,416,976
Whiskey	bbls.	32,437	36,440	33,193

As the cultivation of articles of food is doubtless on the increase, particularly in the states bordering on the Ohio, it thus appears that a greater proportion is required for the consumption of the interior, which may be readily ascribed to the vast emigration to the west.

X.

October, 24th.

FRENCH PRACTICE AND OPINIONS AS TO THE CHINESE MULBERRY.

The article of M. Loiseleur Deslongchamps on successive crops of cocoons, from which we translated some extracts for the last No. is continued at some length in the succeeding (August) No. of the *Annales*—and its conclusion is yet to come. It consists mostly of generalities, together with other and more minute directions for making successive rearings of silkworms, which would scarcely be now of any value to our readers. We shall attend to what the future continuation may offer. In the mean time, the following

* In 1832-3-4—14,500 each corresponding quarter.

* Shipped coastwise.

passages are given, as they furnish evidence, from another source, of the great and early productiveness of the Chinese Mulberry.

"Nothing is more easy now than to multiply plantations of mulberries, as much as may be wished. The kind known under the name of *Multicaulis*, or Perrottet mulberry, not only furnishes the means, by the extreme facility with which it is propagated by cuttings, but it also shortens remarkably the time which before its introduction, was necessary for undertaking the rearing of silkworms. Formerly, with the prevailing usage in planting mulberries, it was necessary to wait at least ten years before begining to feed the worms: by planting for hedges, or low stocks, as many now do, this time is reduced to half; but still five years would be required to begin."

..... "But at this time, with the Multicaulis, it is possible, (as I have already announced in a little work published in the subject,) it is possible, I say, to make a raising of silkworms fourteen months after having planted the slips of this new and precious variety—and the leaves gathered from these slips, from the commencement of the second year, will suffice for the food of a prodigious number of worms. I saw the 1st of last November (1835) at Messieurs de Grimaudet and Latour, at Villemomble, three leagues from Paris, about an arpent* of land which, in the preceding March, had been planted with 72,000 slips, at 6 or 7 inches a part, in flat beds of 4 feet width, separated by paths of 12 to 15 inches. Well; notwithstanding the dryness, which was so considerable in part of the spring, and throughout the summer, 60,000 had so well taken, that one fourth of them had grown to the height of from 4 to 5 feet—two fourths more to 2 and 3—and the other fourth, of the most feeble, were at least a foot high. I have estimated that if these 60,000 slips were left in place, in the spring of 1836 they would have produced 120 quintals of leaves, sufficient for the sustenance of 250,000 to 300,000 silkworms on the produce of 5 to 6 ounces of eggs." .....

"One thing which I have not yet said, and which however appears to be important, is that the mulberries can furnish the means of raising silkworms to tenants who have leases of no more extent than 12 or 15 years, or even of but 9 years." .....

ERRATA.

Page 385, line 14 of column 2, for "*nine-fortieths*," read *nine-tenths*. The error in using this uncommon fraction, was not caused by the inattention or carelessness of the printer, nor without full consideration and consultation—but was owing to the indistinctness of the figure used in the manuscript.

Page 439, line 43, col. 1, for "vol. iii." read vol. iv.

* An arpent is about 1 1-4 acres.—Ed. Far. Reg.

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